TROPICAL DISEASES BUREAU.

# SANITATION SUPPLEMENTS

OF THE

# TROPICAL DISEASES BULLETIN.

## APPLIED HYGIENE IN THE TROPICS.

By Lt.-Colonel W. Wesley Clemesha, C.I.E., I.M.S. (retd.).

Supplement No. 2.] 1923. [July.

## DISEASE PREVENTION.

Balfour (Andrew). **The Sanitary Inspector in the Tropics.**—*Jl. Roy. San. Inst.* 1923. Apr. Vol. 43. No. 7. pp. 321–329.

Recently the Royal Sanitary Institute arranged to have a short course of lectures on tropical hygiene, etc., for Sanitary Inspectors; altogether five lectures were delivered. The first of these fell to Dr. Balfour. It deals, as the title suggests, with the subject of Sanitary Inspectors in tropical countries and with the possibilities of obtaining knowledge of tropical diseases in this country.

The writer points out that the facilities for educating sanitary inspectors in tropical diseases at present are deficient. He hopes that this will be remedied, either by the Royal Sanitary Institute or by the new Institute of Hygiene. He draws attention to the fact that the life history of mosquitoes can very easily be studied in this country, not far from London; Anopheles can be found in streams and ditches in Kent. The fly problem is not confined to tropical countries and can be studied in London. The question of vermin and delousing of clothing and that of ridding buildings from rats, the inspection of tinned and preserved food, etc., can be studied quite well in various centres in England.

Much sound advice is incorporated in the paper as to the necessity for careful handling of alien races who are not as advanced in the knowledge of hygiene as ourselves.

The paper is delightfully written and forms a good introduction for anybody seeking the tropical diseases diploma of the Institute.

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SCHARFF (J. W.). **Rural Sanitation, with a Note upon the Training of Sanitary Inspectors in the Tropics.**—*Trans. 4th Congress of the Far Eastern Assoc. of Trop. Med.* 1921. Vol. 1. pp. 605–606.

A plea that "health work in the rural district should be brought at least up to the standard of that of its neighbouring city in order that the city may undertake its own problems unhampered by influences from without. It is probable that the best means to accomplish this is by the introduction of rural dispensaries staffed by assistant surgeons, sanitary inspectors and assistants." Unfortunately, the writer does not say where the money for this very desirable, but expensive improvement is to come from.

HUNT (D.). **Sanitation in American Samoa.**—*U.S. Nav. Med. Bull.* 1923. Apr. Vol. 18. No. 4. pp. 438–448. With 6 illustrations

The writer gives a chatty and interesting account of health conditions in Samoa, accompanied by some very delightful pictures. There is not a great deal in the paper which should find space in a scientific journal, but the illustrations of the two kinds of latrines, namely, the village pit latrine and the sea latrine, are of considerable interest.

The writer points out that the pit latrine has not been an unqualified success in the Island principally because it is not fly proof. The sea latrine is popular and satisfactory. Flies are greatly increased by the bread fruit falling from the trees and rotting on the ground.

As pointed out *Stegomyia pseudoscutellaris* is the transmitter of filaria, and he considers that elephantiasis is considerably on the decrease. Rats are common but the houses (a photograph of which is given) are not sufficiently sheltered to make them attractive to these animals.

ARAUJO (H. C. de Souza). **Condições medico-sanitarias das Guyanas Franceza, Hollandeza e Ingleza. Impressões de Viagem.** 1923. 39 pp. Publicacao do "Brazil Medico." Rio de Janeiro.

This is an account of a tour made through French, Dutch and British Guiana, and Trinidad. The medical information is mainly that given to the author by officials on the spot and is, therefore, not very detailed. In French Guiana malaria is common and the subtertian variety is responsible for some 60 per cent. of the cases. There are said to be 600 lepers in the colony (or 1·5 per cent. of the population); filariasis is also common. An Institute of Hygiene was established in 1914 at Cayenne where laboratory examinations are carried out.

In Dutch Guiana the population is given as 200,000 and there are some 1,500 lepers, of whom 400 are segregated. Enteric fever and dysentery are endemic and have a high mortality—27 per cent. of notified cases of the former and 30 per cent. of the latter in Paramaribo. In the country districts there are medical stations and plantation hospitals of which the author speaks highly.

In British Guiana malaria claims first place; the following figures are given: in Pomeroy, 428·6 per 1,000 deaths registered; in Noroéste, 271·1; in Demerara, 241·7, are ascribed to this disease. Enteric fever and dysentery are endemic in Georgetown; it is stated that in 1919 there were 265 cases of the former and 270 of the latter in the Government Hospitals and that among these there were 72 and 57 deaths, respectively. Reference is made to the Expedition from the

HUNT (D.).]

FIG. 30.—Public latrine in an inland Samoan village.

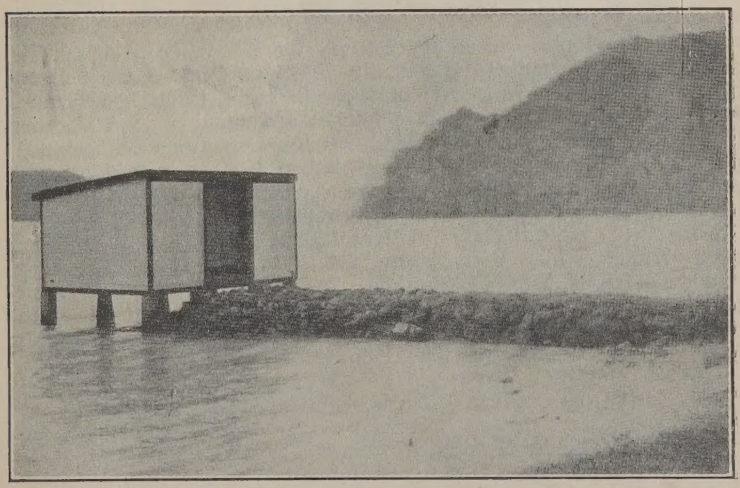

FIG. 31.—Public latrine in a Samoan village on the beach.

[Reproduced from the *United States Naval Medical Bulletin.*]

London School of Tropical Medicine in 1921. Filarial infection is said to exist in the following proportions: Negroes 34·3, Mulattos 37·7, Portuguese 45·4, Hindus 44·4, Chinese 4·7 per cent.

As regards Trinidad the chief diseases noted are malaria, ankylostomiasis, yaws and leprosy. Of the last named there are stated to be 800 cases, 500 in the asylum at Cocorite, founded in 1845. The general sanitary conditions—conservancy, water supply, slaughter-houses, etc.—are described as "excellent and far superior to those in the chief towns of the Guianas."*

COLOMBIA. **Informe del Departmento Sanitario del Ferrocarril de Antioquia para la Asamblea de 1923.**—36 pp. Medellin: República de Colombia sur América. Imprenta Official.

This is a report of the Chief Medical Officer of the railway at Antioquia, Colombia, on the work of the Health Department.

The malarial incidence, in spite of the fact that quinine prophylaxis has been carried on throughout the year, has remained about the same as in 1921, but no deaths from this disease are recorded. Infectious jaundice had a high mortality; only two cases recovered. It is worthy of note that only one case of typhoid fever is recorded.

The greater part of the report is taken up by statistical tables from the year 1908 to 1922, stating the numbers of men employed in different sections of the railway, accident returns, etc. The arrangement of the tables is very involved and the extraction of information difficult.*

PEIXOTO (Afranio). **Um seculo de cultura sanitaria (1822–1922).** [A Century of Sanitation.]—*Brazil Medico.* 1922. Sept. 16. Year 36. Vol. 2. No. 37. pp. 155–164.

It is stated that during the century there have been 3½ million European immigrants to Brazil. In 1830 was founded the Society (later the National Academy) of Medicine and "health guardians" were appointed for prevention of plague and small-pox. A Vaccine Institute was inaugurated in 1846. Improved sewerage was installed in 1857 by "canalization of sewers," but in 1864, in spite of all precautions, the water supplies became contaminated by cholera and 200,000 persons died. About 1880 regulations and measures for disinfection were introduced, and in 1883 a Laboratory of Hygiene was founded, which later became the State Analytical Laboratory for detection of food adulteration. In 1897 a Director-General of Public Health was appointed. Three years afterwards anti-mosquito measures were adopted, and these were followed by town-planning and various other schemes for public and domestic hygiene.

Details are next given of some 15–20 diseases and the histories of them during the century. The most important are: Yellow Fever, which was always present in greater or less degree, especially along the coast, but finally disappeared from Rio in 1908. Malaria, in spite of measures employed, is still very prevalent, and in 1915 and 1916 respectively accounted for 1,612 and 1,398 deaths in S. Paulo, "the most civilized state in Brazil." Plague prevention was aided by the use of concrete and asphalte for rendering the houses rat-proof.

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* Summarized by Dr. H. Harold SCOTT.

Variola has occasionally occurred in very fatal epidemics; in Fortaleza, a small town, there were 15,000 deaths in four months. Under this heading is mentioned a widespread outbreak of Alastrim in 1909, when 200,000 persons were affected. The figures for Leprosy are very vague, varying from 5,000 to 100,000 according to different compilations.*

ORENSTEIN. **Compound Sanitation.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1922. Sept. Vol. 2. No. 5. pp. 1–15. (Discussion pp. 15–19.) With 8 figs.; also *S. African Med. Record.* 1923. Mar. 24. Vol. 21. No. 6. pp. 122–133. With 8 figs.

The writer has seen a great deal of sanitary service in America, Dar-es-Salaam in East Africa, and in the Cape and his paper gives much extremely valuable information concerning "compound hygiene."

The writer discusses the difference between labour aggregated in compounds and that living under natural conditions. In the Panama Canal the pneumonia rate increased regularly with every batch of recruits. When there were about 12,000 with a rate of 5·8, an addition of 10,000 caused a rise to 15·5 per cent. When the recruiting stopped the rate rapidly dropped to 2·1 and remained at that figure for a long time. This, of course, is the general experience in railway and mine work in the tropics.

As regards the housing problem the writer insists on proper ventilation and the avoidance of overcrowding. Also he believes in segregating the inhabitants of a room in proper sleeping spaces or bunks. This in a ventilated room reduces the risk of air-borne diseases. He gives two illustrations of the inside and outside of the better class of compound houses.

The writer describes the type of fire grate he considers best and the type of bunks; the latter are made of reinforced concrete and cost between 8 and 13 shillings each. They are cheaper than wood, and do not harbour bugs like wooden ones, which have to be replaced once a year and boiled every month. A description is given (but unfortunately not plans) of sundry devices for rapidly whitewashing the walls. The windows are made with iron frames and so designed that they remain open permanently at the top. They have to be so constructed that liquor bottles cannot be passed through to the inmates.

Suitable arrangements are made for delousing the clothes of the labourers, and a good deal of attention has been expended on the proper type of bath. The writer strongly advocates a shower bath as being superior to all other varieties. The plan of the design used in the compound is given.

On the subject of diet the writer gives some interesting particulars of the amount of loss due to the various kinds of work underground.

"We found that a native drilling 4 to 4½ hours a day loses somewhere between 4 and 5 lb. weight in the day. When he trams he loses 1½ lb., when he shovels about the same amount, and when he works on a machine about 1 lb., and you have to make that good. This is the first reason for good feeding."

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* Summarized by Dr. H. Harold SCOTT.

To remedy the scurvy so common amongst African labour on a routine diet, oranges and vegetables are provided and care is exercised in cooking the latter; otherwise they are little good as antiscorbutics. It is also found that boiling beans in a solution of ammonium carbonate 2½ oz. to every 50 lb. greatly facilitates the softening process and does not spoil the taste. The writer has not much faith in native beer as an antiscorbutic. One type is frankly useless.

Plans are given of an automatic rubbish bin made of reinforced concrete which has been found to answer extremely well in compounds and possesses an automatic fly-proof lid; also of a good type of simple incinerator for rubbish.

In the discussion which ensued a doctor present asked if the reinforced concrete bunks were not cold and likely to produce lumbago or pneumonia. The writer in his reply said that the surfaces were frequently dressed with some non-conducting material; a clinker-sawdust-cement or a magnesite-sawdust mixture gave as satisfactory results as any of the more expensive mixtures.

BAGBY (B. B.). **Changes in a Small Town brought about by the Health Department.**—*Public Health Rep.* 1923. Mar. 9. Vol. 38. No. 10. pp. 456–458.

The writer makes an interesting comparison between the health of West Point in 1909 and 1922. In 1909 he saw 96 cases of malaria, 15 cholera infantum and 7 typhoid fever, making a total of 108 out of 158 of preventable diseases. In 1922 he had one atypical case of malaria, no enteric and no cholera infantum. The change was brought about by the provision of a protected water supply and a sewage system.

Under the old regime, with the hand removal system of night-soil, the milk man who sold about 80 per cent. of the total milk consumed took on the contract for cleaning the privies during his spare time, with disastrous results. The writer also points out that he has not seen a case of hookworm disease for five years.

COOMARASAMY (A. N.) & SELVADURAI (R. V. N.). **A Scheme of Maternity and Child-Welfare for Ceylon.**—*Jl. Ceylon Branch of the Brit. Med. Assoc.* 1922, Sept.–Dec. Vol. 19. Pt. 3. pp. 4–8.

The writer describes a scheme for child welfare work for the colony of Ceylon. "The scheme should be worked by:—

"(1) Head of the Department.

"(2) Nine officers for the nine provincial towns of the island.

"(3) 33 officers—one each for each of the principal towns.

"(4) Health-visitors (*a*) Official—one each for each of the principal towns, and more pro rata for the population wherever necessary; (*b*) Honorary—as many as are willing to serve.

"(5) Midwives. Two midwives for each town, and more when necessary pro rata for the population.

"(6) Nurses. Two each for each town.

"1. The civil and district hospitals for curative purposes as also for work of a preventive nature. A certain percentage of the beds in the hospitals in the principal towns shall be reserved for maternity and child welfare work.

"2. Ante-natal clinics for advice and treatment when necessary to expectant mothers. These clinics should have their centres in the hospitals. The district medical officer shall visit these centres twice weekly at fixed hours.

"3. Convalescent centres for necessitous cases. A few beds in these hospitals shall be reserved for convalescent cases.

"4. Schools for mothers
"5. Milk depots.

} The local authorities and the philanthropic public shall do the needful in connexion with these."

The cost of working this organization the writer estimates at about 1½ lakhs per annum. He suggests that the funds shall be provided by local authorities.

JOURNAL OF THE ASSOCIATION OF MEDICAL WOMEN IN INDIA. 1923. Feb. Vol. 11. No. 1. pp. 3–9.—**The Organisation of a Milk Depot at a Welfare Centre, as Suited to the Needs of India, bearing in Mind Economy, Efficiency of Distribution and the Possibility of Fraud.**

An account of child welfare work in Triplicane in Madras. The well-known difficulties of obtaining good milk are described. All children below the standard of nutrition and weight for their age are given milk from the depot. In 1921, 200 infants were supplied at an average cost of Rs. 2 per month, not including initial cost of sterilizer. The milk was pasteurized and distributed in sanitary milk-cans. The results have been most gratifying. In two welfare centres where milk was not distributed there was in the year 1921 an infant mortality of 224 and 169 per mille; whereas in the centre where milk was distributed the infant mortality was 139·9 during the same year, having come down from 231·9 in 1920.

SIAMESE RED CROSS SOCIETY. Oriental Conference of the League of the Red Cross Societies. Bangkok. 1922. Nov. 29–Dec. 8. **The Work of the Rockefeller Foundation in Siam.** 8 pp. **The Public Health Activities of the Siamese Red Cross Society.** 10 pp. With 2 maps. [BARNES (M. E.), Medical Director.]

These are two very interesting little pamphlets on the work of the Red Cross Society in Siam, the active agent of which appears to be the Rockefeller Foundation. The activities are described under two heads, namely, the public health section and the section connected with medical education. As regards the former the department has concentrated on hookworm disease in all its branches, namely, treatment, introduction of sanitary latrines, establishment of sanitary inspection and health educational measures reaching every village.

This work the authorities rightly consider to be of extreme value. Not only does it remove hookworm disease, but it introduces sanitary habits amongst the population and, incidentally, water-borne disease, the breeding of flies and other insanitary conditions should be considerably ameliorated. With this contention there can be no disagreement. The educational and propaganda measures alone will be of great practical value in disseminating knowledge of public health, and it is obvious that any disease such as malaria and leprosy can easily be added to the subjects dealt with. As a matter of fact much work has been done on the subject of leprosy. There are 10,000 lepers

scattered throughout the kingdom of Siam and very few arrangements for their treatment. A leper asylum has been established in Bangkok, and others are contemplated in other parts of the country. Special dispensaries are also to be founded.

The following interesting epitome of statistics gives a clear idea of the work done.

STATISTICAL REPORT OF THE PUBLIC HEALTH SECTION, THE SIAMESE RED CROSS SOCIETY, TO SEPTEMBER 30, 1922.

| | Total from Feb. 7, 1917, to June 30, 1922. | Quarter ending Sept. 30, 1922. | Grand Total to Sept. 30, 1922. |
|---|---|---|---|
| Examined for hookworm .. .. | 208,552 | 43,086 | 251,638 |
| Found infected with hookworm .. | 140,854 | 23,933 | 164,787 |
| Given first treatment— | | | |
| For hookworm .. .. .. | 177,642 | 14,964 | 192,606 |
| For other intestinal parasites .. | 37,585 | 6,390 | 43,975 |
| Without examination .. .. | 9,822 | 10,313 | 20,135 |
| Total first treatments .. .. | 225,049 | 31,667 | 256,716 |
| Treatments for other diseases (since 1920) .. .. .. | 5,900 | 221 | 6,121 |
| Treatments given for leprosy (since May 1922) .. .. | 190 | 624 | 814 |
| Sanitary latrines inspected .. | 17,826 | 3,809 | 21,635 |
| Public lectures held .. .. | 1,357 | 219 | 1,576 |
| Estimated attendance at lectures.. | 126,047 | 26,660 | 152,707 |
| Health exhibitions held .. .. | 5 | — | 5 |
| Estimated attendance at exhibitions | 165,000 | — | 165,000 |
| Health booklets distributed .. | 48,011 | 3,347 | 51,358 |

BROOKE (Gilbert E.). **The Ventilation of Ships.**—*Trans. 4th Congress of the Far Eastern Assoc. of Trop. Med.* 1921. Vol. 1. pp. 535–555. With 5 text figs. [8 refs.]

This is an important article for all concerned with port health and shipping work. It deals very fully with the history of ventilation in ships, and the chemistry of contaminated air, and gives some interesting facts which may not be as well known as they should be.

The author points out that bilge water frequently gives off quite an appreciable amount of $H_2S$, that insanitary latrines discharge ammonia; and that a mixture of red lead and linseed oil absorbs so much oxygen from the air as to be almost a danger. Cases have occurred (at Singapore) of poisoning by benzine vapour in oil ships. Cargoes of ferro-silicon caused 28 deaths on seven ships between 1905 and 1908; the alloy is a product of iron and silicon and looks like pig iron; in the presence of moisture one ton may evolve as much as 16 cu. ft. of phosphoretted hydrogen ($PH_3$), with smaller amounts of arseniuretted hydrogen.

We have already referred to the fact that certain vegetable cargoes, notably damp tobacco, will deprive the air of oxygen. The writer gives an example of a ship with a cargo of oranges in a very badly ventilated hold. Analysis of the air in the hold showed 22·55 per cent. of $CO_2$ and only 1·86 per cent. of oxygen. The first two men to enter were asphyxiated. Subsequently ventilation with cowls entirely remedied the defect. The writer then discusses the bacteria present

in air in holds of ships and admits that very few are pathogenic. Concerning air space he makes the following remarks :—

"Before considering the methods of ventilation it should be remembered that there are two standard requirements which should never be departed from :—

"(1) The net cubic space per man must be at least 200 cu. ft. in sleeping places, or 350 cu. ft. in sick bays, and

"(2) A minimum supply of 3,000 cu. ft. per hour (50 cu. ft. per minute) of fresh air should be secured without draughts for each person in all sleeping, working, and living spaces ; not 830 cu. ft. per hour as required by British Board of Trade for their emigrant ships ! !"

United States Public Health Service. **Health News.** [Mimeographed Circulars. Nos. K 739 & 744.]

**National Negro Health Week.**

"During the week the steady decrease in the Negro death-rate discussed last year will again be emphasized. Statistics show that in Maryland and North Carolina, the only two southern states in which the records go back for ten years, the negro death-rate decreased 7·8 and 32·8 per cent. respectively ; and that in Kentucky and Virginia, in which the records go back for only five years, the rate decreased 11·8 and 11·1 per cent. respectively. In other southern states these records do not go back as much as five years.

"These figures seem to indicate that American Negroes are not necessarily short-lived nor especially liable to disease, and that their death-rate is largely due to their comparative poverty. The point is made that better hygienic conditions would reduce the rate of both sickness and death and do away with much of the industrial loss caused to employers by absenteeism."

**Vaccination.**

"In the United States, well-vaccinated communities show low small-pox rates—Maryland with one-tenth case per thousand population ; New York with one-fortieth per thousand, and the District of Columbia with 0·14 per thousand. Poorly vaccinated States tell another story—Oregon with 1·45 ; Washington with 1·72 ; and Kansas with 2·0 per thousand population.

"Some communities wait till an epidemic breaks out and then rush to vaccinate. These stop the disease—after it has caused many deaths and has "branded" many survivors. Sixteen months ago, in Kansas City, an epidemic of small-pox began, yielding 350 cases and 123 deaths ; and a few months later another started in Denver and yielded 950 cases and 288 deaths. Such epidemics always end the opposition to vaccination in the community—for a time."

Ross (G. A. Park). **Control of Malaria in the Union.**—*S. African Med. Rec.* 1922. Dec. 9. Vol. 20. No. 23. pp. 450–458.

The writer gives an extremely interesting picture of what may be called the "Malaria Problem" of parts of the Union of South Africa. It will be remembered that we dealt with the same problem from the point of view of the School Medical Officer [San. Supp., 1922, No. 3, p. 168]. The paper is closely reasoned and consequently it is difficult to do it justice.

"Our problems, racial, financial, and geographical, are no more complex than those of the States, and what has been done there can be adopted with modifications in South Africa. The essential feature of the American schemes is State control, and without State control of malaria the full agricultural possibilities of the Union cannot be realized. And what should State control in the Union stand for?

"First. Systematized organization, including active, effective, and continued supervision of anti-malarial measures in those areas already carrying a fair European population.

"Second. In the undeveloped lands and native reserves provision of means to help the natives to help themselves.

"Third. A policy of land settlement which recognizes that much of the low rich land of the Union is unsafe for natives and for poor whites, and only fit for the best class of European settler; a policy which recognizes malaria as a prime disability accruing to these lands, to be met by a class of settler who is prepared as a condition of settlement to adopt such measures of self-protection as may be prescribed."

The author then deals with the relations of mosquito prevalence, reservoir of parasites, and climatic conditions.

"Although I might say that the incidence of malaria in the Union is largely a matter of geography, its intensity or its epidemic prevalence is partly determined by our third factor, namely, the susceptibility of the population affected. This is to a certain extent a matter of race. The native has, in highly malarious parts, acquired a measure of immunity, and as regards the European, social condition is an important factor."

Dealing with the Union, the author describes a map of the malaria distribution as follows:—

"There are four grades of areas shown:—

"'A.' Continuous. Yellow. New infections throughout the year. Blackwater fever occurs. Malaria almost a certainty unless meticulous precautions taken.

"'B.' Serious. Red. There is invariably a summer epidemic, and blackwater fever occurs. Severe infection highly probable unless precautions taken.

"'C.' Moderate. Blue. Summer epidemic every year, but type is milder. Blackwater fever—nil. Malaria likely if no care taken.

"'D.' Slight. Green. Fever only, occasionally epidemic. Infection uncertain and only likely in epidemic years.

"The yellow area is low-lying savannah and swamp. Similar country occurs nowhere else in the Union, but extends in a huge belt north through Mozambique and to the east of the Ubombo hills. The land is rich.

"Some years ago I made a detailed survey of this and the surrounding country, and examined some hundreds of children under ten. Incidentally I found five cases of human spirochaetosis (tick fever), and the distribution of *O. moubata* in Zululand happens to coincide with the yellow area. To give an idea of the malarial intensity I quote the following:—

"Fifty-three per cent. of the children examined showed parasites.

"Eighty-two per cent. showed parasites or pigment, or a large monocuclear leucocytosis.

"Seventy per cent. showed enlarged spleens, corroborated by blood test as being due to malaria in 60 per cent. This check was used to eliminate enlargement due to hookworm, which is prevalent.

'. Of those with parasites, 53 per cent. were benign, 47 per cent. malignant. Some of the infections were intense, for instance :—

" Twenty per cent. of the corpuscles in one film infected.

" Six corpuscles containing three ring parasites each in one field, and many other instances of gross infection.

" In the surrounding red area my parasite rate went up to 96 per cent. of the child population. The spleen rate was lower, *e.g.*, 40 per cent., corrected by blood test to 36 per cent."

. . . . .

" Natives and residents in ' A ' and ' B ' areas should always be regarded as carriers.

" Malarial as these ' A ' and ' B ' areas are, they are capable of effective and economic settlement. The richest sugar lands of Natal are ' B ' class, and if anti-malarial measures were systematized, supervised, and compulsory, they would be comparatively safe for women and children throughout the year."

The methods of attacking the problem do not differ from those employed in other parts of the globe but in certain parts of India the problem is very largely one of suitable agriculture. A progressive malarial policy would have to provide for :—

" (1) The improvement of existing conditions.

" (2) Legislation dealing with the conditions favourable to the spread of malaria, and including a statutory obligation on the individual to protect himself, his dependants, and employees.

" (3) Anti-malarial work as an essential feature of every land settlement, irrigation, educational and relief scheme.

" (4) Limitation of occupation of land by poor whites except under proper supervised anti-malarial conditions.

" (5) Measures for relief of natives and regulation of native labour."

. . . . .

" I regard it as bad policy to put native labour from a non-malarial locality to work in a malarious locality. Epidemics will surely follow. Far better it is to restrict recruiting for the low veld to the low veld, and trust to elimination of native carriers by systematic use of quinine and nets or other means for one's own protection."

. . . . .

" Other land occupants. I use this term to include poor whites, for whom the low veld seems to have a special attraction. The disposal of these people presents a very difficult problem which for us hinges on the question as to whether or not the State sets out to make beneficial occupation of land obligatory in the low veld. No man can beneficially occupy or develop land unless he manages to keep clear of fever, and a great number of poor whites and nomads who haunt the low veld can never be depended upon to use means to keep themselves free of it without constant and unending supervision. If such must be settled in the low veld, then let it be intensive settlement under permanent resident Government supervision, and let Government be prepared to do all the work, to net houses, to supervise drainage, to supervise quinine administration, and to make proper disposition for the numerous children—an expensive business. The high veld is the place for the poor white. He is too expensive for the lowlands."

The writer points out that quinine taken in cheap South African sherry is often acceptable to the native population when it will not be taken in any other way, and that fish stocking as an anti-larval measure has not been found very successful in the Union of South Africa.

Bulletin de la Société de Pathologie Exotique. 1923. Jan. 10. Vol. 16. No. 1. pp. 51–52.—**Discussion du rapport sur la prophylaxie du paludisme à Dakar.**

At a meeting of the Société Medico-Chirurgicale de l'Ouest-Africain on January 17, 1922, at which was discussed the report of the Commission on Prophylaxis of Malaria in Dakar, it was resolved to urge on the Government that the approved sanitary programme should be expedited, that there should be frequent flushing of drains with sea water, that systematic quininization of children should be continued, that propaganda and instruction should be pushed, and that infringement or evasion of the existing regulations should be severely dealt with.*

Palestine. **Proceedings of the Sixth Meeting of the Antimalarial Advisory Commission, 30th November 1922.** [Heron (G. W.), Director of Health, President.] [M.S. received from Colonial Office.]

These "Proceedings" always contain much interesting matter. Recently the Joint Distribution Committee of American Funds for War Sufferers has financed for the Department of Health a complete Anti-malaria Research Laboratory at Haifa under an able bacteriologist.

A sudden outbreak of malaria at Yemma occurred in September and was eventually traced to mosquitoes breeding in a canal filled in with stones and to other places around the colony. Adult mosquitoes were mostly *A. sergenti* and *elutus*.

"Major Low said that the incidence of malaria among the British and Indian troops in Palestine has been very low this year. Among about 800 British troops (including gendarmes) there had been 24 primary and 65 recurrent cases, and among about 3,000 Indian troops there were only 2 primary cases and 83 recurrent."

A good deal of work has been done on the subject of *Chara foetida*, and the claims put forward that this plant keeps Anopheles away are not substantiated in Palestine. Officers have reported that Anopheles larvae have been found in ponds where Chara was growing luxuriantly.

The conclusion reached was that there were four groups of Anopheles in Palestine: (1) the strictly rural group, which does not enter houses, *hyrcanus*, *algeriensis* (and probably *mauritianus*); (2) rural species which enter houses and tents and are of great importance, *elutus*, *sergenti*, *superpictus*, and *multicolor*; (3) the carrier of urban malaria, *bifurcatus*; (4) a species of great rarity or doubtful occurrence, *pharoensis*.

Some attention had been paid to larva-eating fish and the conclusion reached that Cyprinodon was very valuable and Tilapia and eels nearly as valuable; live Cyprinodon were exhibited. One Culicine new to Palestine and another new to science had been discovered (exhibited). The flame-thrower seemed to be an unsuitable weapon for the destruction of reed beds. Photographs taken during experiments with a type of flame-thrower were shown to the members.

* Summarized by Colonel Clayton Lane.

DE VERTEUIL (Eric). **Anopheles and Malaria Control in the Brighton-La Brea Rural Sanitary District, Trinidad, B.W.I.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1922. June 22. Vol. 16. No. 3. pp. 99–116. With 8 figs., 1 map & 4 charts. (Discussion pp. 117–118.)

The writer gives an interesting account of the antimalaria measures at the famous Trinidad Pitch Lake. This lake is worked by a company with a staff of nearly 2,000 individuals, including wives and families, and 250,000 dollars have been invested in the enterprise.

The place has always been more or less malarious. Palliative measures have done good, but something more radical was decided on.

As the unlined drains were acting as breeding-places for mosquitoes, a cheap, appropriate, and ingenious method of lining them with asphalt was investigated and proved a very great success.

FIG. 32.—Drain before being prepared for lining with asphalt.

This method, which is graphically shown in the illustrations, consists in first cleaning away the grass and sometimes killing the roots by fire. The bottom and sides of the drain are then covered with liquid asphalt which is a local product, 1 gal. to the square yard. On to this is shaken dry sand, which soaks into the asphalt and tends to thicken it. A fire is now started by lighting some cotton waste dipped

in oil; when this is burning satisfactorily the surface of the asphalt is sprayed with sanitary oil, which apparently is a mixture very like ordinary crude oil but containing certain of the lighter bodies. With the aid of the oil the asphalt burns with a very fierce heat; when hot some additional sand is sprinkled over it. On cooling it is found that the drain has a hard smooth surface (the lining being about $\frac{3}{4}$ in. thick), which is to all intents and purposes as good as concrete and masonry. To prevent the asphalt from flowing down the drain small battens of wood are inserted during the heating process. The cost per square yard of surface lined, about one-fifth that of concrete, is given below:

| | | |
|---|---|---|
| Liquid asphalt, 1 gall. (U.S.) .. | 10 cents to | 15 cents. |
| Sanitary Oil, $\frac{1}{10}$ gall. (U.S.) .. | 1 ,, | $1\frac{1}{2}$ ,, |
| Sand, $\frac{1}{8}$ cubit foot .. .. .. | 1 ,, | 1 ,, |
| Labour .. .. .. .. | $2\frac{1}{2}$ ,, | $2\frac{1}{2}$ ,, |
| Total cost per square yard of surface | $14\frac{1}{2}$ ,, | 20 ,, |

Fig. 33.—Preparation of drain to be lined with liquid asphalt.

Other troublesome breeding-places, extraordinary as it may seem, are the pitch holes at the edge of the lake which become filled by rain. Since the lake, which is about 80 acres in extent, lies about 20 ft. below the surrounding ground and forms a large catchment area, not infrequently the whole surface is covered with rain water which has to be removed by pumps. The holes at the edge cannot be filled up, since the material sinks into the pitch and disappears. The difficulty was overcome by clearing the grass from the holes and stocking them with fish, three local species of which have been used with considerable success.

FIG. 34.—Burning liquid asphalt with sanitary oil spray.

FIG. 35.—Completed drain lined with liquid asphalt—one month after.

"Three species of fish are found in the lake: (1) the small guabin (*Rivulus harti*); (2) millions (*Lebistes reticulatus*); (3) *Polycentrus schomburghii*. The first (*R. harti*) is mentioned by Mr. P. Guppy, of Trinidad, in an article written in 1911, as being able to travel considerable distances and to reach isolated pools owing to its powers of leaping. It is a voracious larvae-eating fish, and is able to live up to two and a half hours outside of the water."

Other breeding-places are ruts of wheels and footmarks of cattle, infested by *A. tarsimaculatus*. As a result of the campaign the malaria figures of 1920 and 1921 show a very decided improvement on those of 1919.

FIG. 36.—Completed drain lined with liquid asphalt—two months after —showing pieces of barrel hoops in position. These are driven in flush with the surface or removed immediately after burning.

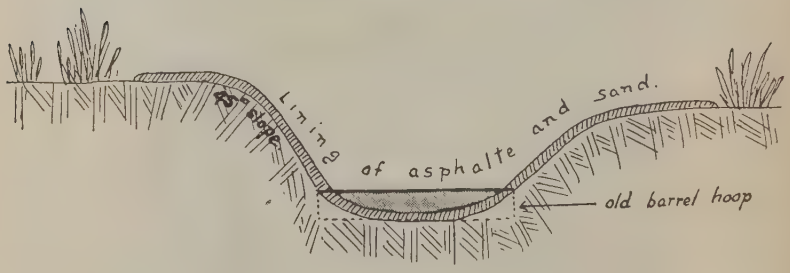


FIG. 37.—Section of drain showing old barrel hoop placed across bottom to prevent burning oil and liquid asphalt from running down the drain.

[Reproduced from the *Transactions of the Royal Society of Tropical Medicine and Hygiene*.]

Sella (Massimo). **Aspetti generali della Lotta anti-malarica.** [General View of Antimalarial Campaigns.]—*Policlinico.* Sez. Prat. 1922. Mar. 13 & 20. Vol. 29. Nos. 11 & 12. pp. 345–352 ; 383–392. [45 refs.]

In the first of these papers a general review of antimalarial measures is given with statistics of their several results taken chiefly from American sources. The following receive mention : (1) antilarval measures and the effects of introducing *Gambusia affinis* in the United States, Italy, and Spain ; (2) the prophylactic use of quinine (on this the author places but little reliance) ; (3) the thorough treatment of cases and the results reported of this by Koch in Africa and Bass in Bolivia ; (4) protective measures, such as isolation of patients.

A discussion follows as to the cost *per capita* of the campaign in different localities—Ismailia, Federated States, Arkansas, and various parts of America. For urban districts with a concentrated population Dr. Sella is in favour of antilarval measures for reasons of economy.

The second paper deals first with the question of State intervention and compares the Italian method, which relies mainly on the use of quinine, with the American which attends primarily to antilarval measures. The author states that by the former the mortality was reduced from 41·7 per 100,000 in 1901 to 5·7 in 1914 (a subsequent increase being ascribed to war conditions). He speaks in terms of high praise of the work of the Rockefeller Foundation and of the value of "demonstrative campaigns" as propaganda. The paper terminates with some remarks on cinchona from geographical, industrial and commercial aspects.*

Peterson (E.) & Walker (F. D.). **Mosquito Control in St. Thomas.** —*U.S. Nav. Med. Bull.* 1923. Mar. Vol. 18. No. 3. pp. 291–303. With 7 illustrations. [5 refs.]

The malaria carrier in St. Thomas is *Anopheles albimanus*. The reduction of malaria in the colony was started by the Danish authorities, whose system of surface drainage abolished malaria as an urban problem. In rural areas Anopheles larvae are kept in check by fish, particularly by the guppy (*Lebistes reticulatus*), an indigenous species and a very voracious feeder.

The only other mosquitoes requiring attention are *Aëdes calopus*, Meig. [ = *Stegomyia fasciata*] and *Culex quinquefasciatus* (Say) [ = *C. fatigans*]. The best method of dealing with them is either covering the tubs in which they breed with fine mesh gauze or stocking them with fish, the latter method being much cheaper and the most satisfactory

Some interesting pictures of the kind of work that has to be done in the colony are given.

Fisher (A. K.). **The Value of Carbon Bisulphide in combating Tent Caterpillars and Mosquitoes.**—*Jl. Econom. Entom.* 1922. Oct. Vol. 15. No. 5. p. 373.

"In the control of mosquitoes gasoline is objectionable on account of it making the water unfit for many purposes. Last June the water in a ten-gallon tub was found to be swarming with the larvae of

* Summarized by Dr. H. Harold Scott.

mosquitoes. A few drops of carbon bisulphide was poured into the receptacle and it sank to the bottom, resembling pearl-like bodies. Within a few minutes there was undue agitation among the insects and at the end of half an hour all were dead and floating on the surface of the water. The carbon bisulphide did not give the slightest taste or smell to the water."

COOGLE (C. P.). **A Preliminary Report on the Use of Creosote Oil as a Mosquito Repellent.**—*Public Health Rep.* 1923. Mar. 9. Vol. 38. No. 10. pp. 437–443. With 1 fig.

The writer was engaged in combating malaria in Yasoo, Miss. Ninety-nine per cent. of the mosquitoes that came under his observation were *Anopheles quadrimaculatus*; the other species were negligible. During the course of his work a very interesting fact came to light. In this district were a rail road and a main road running nearly parallel, both of which crossed numbers of small streams necessitating bridges. It was discovered that the mosquitoes rested during the day on the underside of these bridges. The rail culverts were constructed of timber soaked in creosote oil, the road bridges of timber untreated. A careful enumeration of the mosquitoes observed on ten different days during July and August under both kinds of bridges gave 11,524 for the road bridges and only 223 for the railway bridges. This discrepancy was due to the odour of the creosote.

Making use of this fact, certain wooden houses of the poorer kind, which it was impossible to screen, were sprayed with crude creosote. Before the oil was applied the mosquitoes were carefully counted at three separate inspections and totalled 432, 582, 692. At three inspections after the use of the oil no mosquitoes whatever were found.

As the writer points out, this is a very satisfactory way of getting rid of mosquitoes provided that the people will tolerate the slight smell of creosote about the house. It was mainly used for negroes' dwellings, and he considers it superior to creating clouds of smoke by burning of rags, leather or feathers. No ill effect was observed on the health of the people using the house. The cost worked out at 70 cents per room, that is 2 gals. at 35 cents; the material was obtained from the gas works. Considerable reduction in this price would be possible if large quantities were obtained.

The writer also observed that a wooden barrel that had previously been used for creosote and now for storing water never contained larvae of mosquitoes, whereas two alongside it in which no creosote had been used contained large numbers.

PEACH (John H.). **Experiments made with Larvivorous Fish in British Honduras.**—*Jl. Roy. San. Inst.* 1923. Apr. Vol. 43. No. 7. pp. 335–336.

The writer deals with the subject of larva-eating fish in British Honduras. He made experiments with three of the most important, namely, the "Billham"=*Tetragonopterus aeneus*, Gunth. (Characinidae); "Crana"=*Cichlasoma otofasciatum*, Regan (Cichlidae); "Poopsey"=*Mollienisia sphenops*, Cuv. & Va. (Cyprinodontidae). All of these are voracious feeders. Two or three in a vat of water are sufficient to keep it free from larvae.

Cooling (L. E.). **Mosquito-Larvivorous Fishes in Relation to Mosquito Reduction Work in Australia.**—*Health.* Melbourne. 1923. Apr. Vol. 1. No. 4. pp. 94–98. [2 refs.]

The writer gives an account of the various larva-eating fish in Australia.

"A word might be devoted to observation of fish under natural and artificial conditions. While some very encouraging results may be obtained by experiments conducted with fish in aquaria, it would be more or less fallacious to regard these as conclusive evidence as to what the fish in question might do under natural circumstances. Therefore, field observation is liable to be the more truthful. A case in point is *Pseudomugil signifer* (Kner.) (the "Blue Eye"), a species occurring both in salt marshes and fresh waters. While in the fresh-water aquarium this species displays marked predatory habits on mosquito larvae, its presence in any salt marsh is not always indicative of the absence of mosquito larvae *Culex vigilax* (Sk.), *C. sitiens* (Wiede.), and *Mucidus alternans* (Westw.). It is probable that *P. signifer* finds a greater variety of diet in marine forms such as the smaller Crustacea."

The writer further says that certain trout, gudgeon and carp are important destroyers of mosquitoes, but these fish cannot live in water where sewage is discharged. Hence a polluted stream is actually more likely to breed certain mosquitoes than one into which no sewage is discharged. This particularly applies to the domesticated variety, *Culex quinquefasciatus*, which the author describes as almost the index of pollution of streams. This mosquito, the intermediate host in filariasis, never occurs in the bush. It is always present in polluted cesspits, etc. The connexion, therefore, between bad conservancy and the spread of disease is obvious.

Belgaum & Dharwar. **Report (Abbreviated) on the Plague Operations in Belgaum and Dharwar Districts 1920.** [Strickland (C.), Officer in Charge.]—33 pp. With 2 folding charts. 1922. Poona: Supt. Govt. Press. [Price R.1.]

This report is an account of work designed to continue the efforts of Kunhardt and Chitre [San. Supp., 1921, p. 174–9] to eradicate plague infection from certain parts of the Deccan, by strict attention to places likely to "carry over the infection to the next plague season." Several other places were to have received attention, namely, fifteen large grain centres and other places selected by people who knew the neighbourhood in which operations should be commenced if plague broke out.

Unfortunately the original programme could not be carried out owing to the non-delivery of a number of rat-traps. This being so, it is not necessary to give an elaborate description of the work or offer any criticism. The following summary of the plan of campaign and the results are given in the author's own words.

*Historical.*—

"Plague first came to India in 1896 and rapidly established itself all over the provinces. In Bombay Presidency, exclusive of Baroda State, down to the present time it has accounted for 2,397,383 reported deaths.

"In Belgaum and Dharwar districts alone 479,854 people have died, an average of nearly 20,000 per annum or 10 per mille of the

population, while in the years 1901 to 1904, 213,420 people died, equal to 10 per cent. of the population.

" The cost to the State of this appalling mortality has been estimated to be nearly 30 crores of rupees from death alone, or 1·2 crores on an average per annum.

" The Indian Plague Commission was appointed in 1905 under these circumstances and their reports and conclusions on the subject of epidemiology of the disease placed its prevention on a sound footing.

. . . . . .

" *Methods and Materials.*—

" The categories of places taken for operations covered the requirements of the Government resolution.

" A great deal of reliance was placed upon the measure of trapping which had never been used on an extensive scale in India ; and also upon starting the operations by January 1, if possible.

" The methods followed for the most part Dr. Chitre's courses of instruction to the staff, which were based upon the recently acquired knowledge of rat bionomics.

" Local bodies helped in every way and appreciated the work, while the ryots submitted with scarcely any objection to the unpleasant consequences of poison baiting.

. . . . . .

" *Financial.*—

" The total cost of the work for 1920 was roughly 1¼ lakhs. The working cost of the operations came to Re.1 for 35 rats killed.

" The proposed cost of the operations at about 2 lakhs per annum, including capital depreciation at 20 per cent., was a mere trifle compared with the annual estimated loss of 1–2 crores per annum, in these districts alone, and compares unfavourably with the efforts made in the Panama Canal Zone, where the cost of Sanitation was 5 per cent. of the General Administration.

" The Work in the Various Classes of Places.

" (A) *Carrying-over places.*—

" Thirty places were marked down as likely to carry-over.

" Unfortunately work could not be started in them, if at all, till very late in the off season ; instead of by January 1, as hoped for in the scheme as drawn up, and promulgated in G.R. No. 10858.

" Twenty of them only had any operations during the off-season, while 10 had none at all.

" Of the 20 :—

" (*a*) Three—the big towns, Belgaum, Dharwar, and Hubli—had a considerable amount of work conducted in them, and the results were excellent even though they were surrounded with infected villages later in the year.

" (*b*) One, the big town of Gadag-Betgeri, had a less amount of work, started very late in the off-season and the results were not so good, as it suffered a small epidemic (4 per mille) in the plague season.

" (*c*) One, the big village Khanapur, had considerable work conducted in it with old inefficient traps, and the results were poor.

" (*d*) One village had no other measures than a few inoculations, and the results were poor.

" (*e*) Two villages had poison baiting in May and June and the results were good, plague not carrying-over.

" (*f*) Twelve villages had operations started only as late as June, and even then the work in some cases was purely nominal. In the sequel 6, or 50 per cent. developed plague, the remainder keeping sterile of plague.

" In general the results proved that operations started early, and conducted on a considerable scale are efficacious, whereas poison baiting started as late as June is not of much avail.

" Of the 10 (which had no operations in the off-season at all), 7 developed plague, or 70 per cent.

" It is satisfactory at any rate to note that the places operated in during the off-season, although in some cases only nominally, showed more satisfactory results than those which were not operated in, although the attempt in the former case to prevent carrying-over *completely* was not successful.

" Fifteen places which had not been marked down to ' carry-over ' developed infection in the later plague season ; in some cases undoubtedly the result of carrying-over, in others the result of reinfection from without.

" Kunhardt's formula for predicting which places might carry-over was therefore inadequate for these districts (as Kunhardt himself adumbrated), and the true formula based on an analysis of the last seven years' epidemics is now being worked out for future guidance.

" (B) *Big Grain Centres.*—

" Fifteen were indicated in G.R. No. 10858. Of them :—

" (*a*) Five were operated in, as they had been marked down to carry-over, and apart from the fact that they either did carry-over or were reinfected, the results were excellent in four, as the infection could not do more than make a slight impression, although these towns were surrounded by heavily infected villages. The result in the remaining one place was poor owing to inefficient traps being used.

" (*b*) Seven did not develop infection during the year. They were all operated in sooner or later.

" (*c*) Three developed infection without *prior operations.*

(BB) *Other selected big Grain Centres.*—

" Seven places were registered, three operated in.

" Of the three operated in none became infected ; while of the remaining four 50 per cent. did so.

" (C) *Places becoming important on the Supervention of Plague in the same Taluka in the Off-season.*—

" Forty-nine places in this class came on to the register.

" The influence of operations seemed very encouraging, as only 10 per cent. of those in which operations were undertaken developed plague, while 75 per cent. of those in which no operations were started did so.

" (CC) *Places becoming important on the Supervention of Plague in the same Taluka in the Plague Season.*—

" Sixty-five places in this class came to the register.

" The influence of the operations seemed encouraging, as only 4 per cent. of these places which were operated in developed plague, while 24 per cent. of those not operated in did so.

" (D) *Other selected places particularly exposed to infection.*—

" Belgaum Cantonment showed very satisfactory results after constant work in it, as in spite of plague in the surrounded villages only one imported case occurred in the plague season, while of the remaining eight places all operated in none became infected.

" (E) *Infected places.*—

" No conclusions of any scientific value could be drawn from the data, but the results appeared for the most part satisfactory, no place which was operated in after it became infected developing severe infection.

" Of a considerable number of places operated in after rat mortality had been reported not one developed human plague.

" Altogether 254 places were registered in this class and 354 monthly operations performed during the year in the 188 places in which any work was conducted.

" (F) *Places in Native States.*—

" Shahapur was the outstanding example in this class of place. It had continuous trapping in it for the latter seven months of the year, and although it developed plague early in the plague season, this never assumed serious proportions, only 27 cases being reported out of a population of about 10,000.

" *Conclusions.*—

" The work carried on in the above classes of places showed no discouraging feature at all, while on the other hand the effect of even slight operations in every class seemed to be better than could be anticipated. This result was probably due to the use of the newly devised traps, which were found in practice to be about ten times as efficient as the old type.

" Great promise for the results of the present year's working was shown, but it had to be borne in mind that two important factors will have to be reckoned with before ultimate success is attained :—

" (1) Inefficient registration of plague by village officers.

" (2) Dishonest and inefficient work of the executive staff in charge of the work. "

ARMSTRONG (W. G.). **Plague in Sydney, 1921–22.**—*Health.* Melbourne. 1923. Feb. Vol. 1. No. 2. pp. 31–33.

" The 1921–22 outbreak of plague in New South Wales lasted from 19th September, 1921, until 13th July, 1922, a period of nearly nine months. Sydney was the only locality affected. During the period in question 35 human beings were attacked, of whom 10 died. The number of plague-infected rats found was 151. The first plague rat was got on 19th September, 1921, and the last on 13th July, 1922. The first human case occurred on 29th November, 1921, and the last on 9th June, 1922."

* * * * *

" The outbreak consisted of a primary focus of infection and six offshoot groups, most of them situated at considerable distances from the primary focus. The primary focus was situated in the business portion of the city near the wharfs of Darling Harbor, and it became infected by means of plague rats which reached it oversea from Queensland. In each of the secondary outbreaks the infection was grouped round a produce store or a stable which had been supplied with fodder, etc., from the Darling Harbor wharfs. The inference was that plague rats carried in the produce had infected each of these localities, and plague rats were found in every distinct area infected."

For many years prior to the outbreak steady progress had been made in the permanent rat-proofing of wharfs and business places along the water front and throughout the city by means of concrete

flooring and sheeting. Particular attention was paid to produce stores, stables and buildings where food was stored and sold.

In the outbreak of 1921 all places where dead rats were found were fumigated with HCN. No accidents occurred from the use of this poison but customary precautionary measures were taken. After disinfection the premises were held in quarantine until all defects in the building had been made good by the owner, rat holes filled up, basements concreted and the premises put generally into a rat-proof condition.

Patients were all treated in hospital and a modification of Yersin's anti-plague serum was used. The mortality amongst 31 patients admitted was 22·6 per cent., and of the whole outbreak 28·5.

We have referred elsewhere to the publication of the Journal "Health" by the Commonwealth of Australia. The February number contains, besides the three articles from which we have already quoted, several very interesting papers.*

We strongly recommend Sanitary Officers all over the Tropics to obtain copies of this small journal. It is published by authority of the Commonwealth Department of Health; no price is given, consequently we presume that application should be made to Dr. J. Cumpston, Director General of Health, Melbourne.

Elkington (J. S. C.). **Plague Control in Java.**—*Health.* Melbourne. 1923. Feb. Vol. 1. No. 2. pp. 25–30. With 3 text figs.

We have referred in previous numbers to the reports by Dr. Vogel on the measures taken against plague in Java, but Dr. Elkington's paper is so concise and important that even at the risk of repetition we quote portions of it.

"The underlying principles on which plague work is carried out in Java as the outcome of Dr. Otten's work and under his direction may be summarized briefly. The principal affected areas have been in the mountain districts, which in every sense form the backbone of Java. Three species of rat are here found in definite association with man and his works. *Mus rattus griseiventer*, the grey-bellied black rat is the house rat proper. Its normal habitat is in the roofs, bamboo timberings, and other harborage afforded by the native methods of house building. *Mus rattus griseiventer* is essentially a house rat, and cannot live a feral life in competition with the other prevailing species. Once got out of houses, and kept out, it rapidly dies out. It does not move from village to village or travel for any distance. It is a highly effective plague carrier and its flea is the *Xenopsylla cheopis*, the plague conveyer par excellence.

"In complete contrast to *Mus rattus griseiventer* is the field rat, *Mus rattus diardii*. Its habitat is the fields, and when the "sawahs" or enclosed rice patches are irrigated it moves to the low banks used for confining the water. It is partly dependent on man in that it feeds mainly on his crops, but it does not come into houses, and for all

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* Plague in Australia, 1900–1909. J. H. L. Cumpston.
The Rat Menace, H. A. Longman.
Biological Preparations in Relation to Public Health, W. J. Penfold.
Australia's Special Problems in Tropical Hygiene, R. W. Cilento.
The Chemical Treatment of Water Supply in Active Warfare, and the Application of the Methods to Water Supply in Country Districts, M. J. Holmes.

practical purposes leads an entirely feral life. It is capable of being infected with plague, and on a few occasions has been found so infected in nature. Its flea is the *Pygiopsylla ahalae*, a large slow-moving flea which is not an active carrier in the sense of *Xenopsylla cheopis*, but which is suspected of being able to transmit the chronic form of rat plague.

"The third member of this unholy trinity is *Mus concolor*. This is normally a field rat, which prefers for its habitat the low hedged banks surrounding the villages, but whenever a house is freed from *Mus rattus griseiventer* it becomes an active house dweller. Like *Mus rattus griseiventer* it is an active plague conveyer, and it has the same flea. A variety of *M. concolor* from Rangoon has of late years made its appearance in the littoral about Sourabaya and Samarang, but it is different in habits from the Javanese *concolor*."

The main object therefore of the anti-plague measures was to render houses in Java uninhabitable by *Mus rattus griseiventer*. Thatched roofs had to be dispensed with, tiles were substituted and the industry of tile making was definitely put on its legs again. In the construction of new houses bamboos were not allowed because they furnished nesting places and afford the rats easy ways of access to the roofs.

In houses into the construction of which bamboos enter it was discovered that by slotting the top joint, rat runs could be detected at once. The accompanying illustration shows how this has been done. By plugging the ends of bamboo rafters and exposing their under surfaces these harbourages were also removed.

Administrative arrangements were made with village head men in order to ensure that houses were maintained free from rats.

"Under present conditions, the methods of plague control in Java afford an example to the world. They are clear cut and definite, nothing is left to chance, they are based on accurate observation of the actual conditions to be met, they are carried out with common sense and intense thoroughness in every detail, they are not hampered by official jealousies or by any underlying contempt in high places for "these bally faddist doctors," and they are financed and considered like any other obviously necessary undertaking of Civil Government. The view is officially accepted that if it is necessary to rebuild every village in Java to get rid of the plague every village must be rebuilt. The Dutch authorities admit that it may take a long time and a great deal of money, but they refuse absolutely to accept plague as an ordinary feature of their colonial landscape in the twentieth century."

PONT (H. Maclaine). **Anti-Plague Bamboo Constructions.**—*Trans. 4th Congress of the Far Eastern Assoc. of Trop. Med.* 1921. Vol. 1. pp. 609–616. With 1 plate.

The author describes an improved method of bamboo construction for native houses; apparently the paper is a translation, for it is a little difficult to follow his meaning.

He points out that bamboo structures, if the bamboo is treated properly, will last for many years and that a great saving can be effected by judicious use of bamboo laths. The durability of bamboo depends upon its retention of a certain amount of moisture, and this can be secured by soaking it in sea-water for 5 or 6 days before use. He has designed a new form of nail for bamboo; it has a chiselled edge instead of a sharp point, and does not split the bamboo.

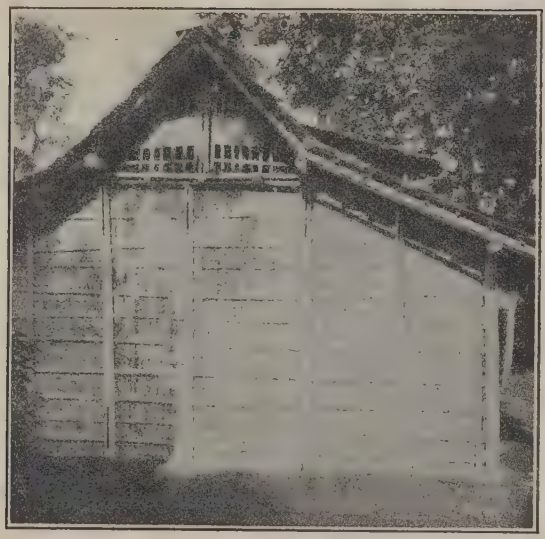

FIG. 38.—Village house, Central Java, protected against rat infestation. Note tile roof, lighting of roof interior through gable ends, plugging of end wall plates, and slotting of bamboo uprights.
[Reproduced from *Health*, Melbourne.]

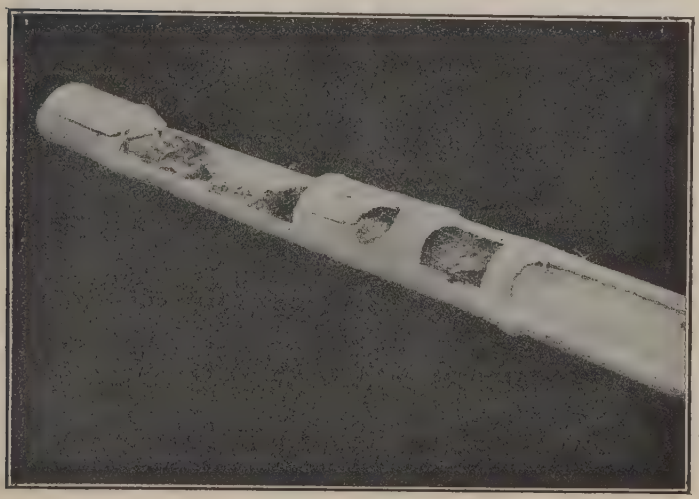

FIG. 39.—Desiccated carcasses of rats found on opening up a bamboo roof timber in a plague-infected house, Java.
[Reproduced from *Health*, Melbourne.]

HECKENROTH (F.). **Quelques considerations sur la nécessité d'utiliser les cordons sanitaires contre la peste en Afrique Occidentale Française.**—*Bull. Soc. Méd.-Chirurg. française de l'Ouest-Africain.* 1919. Oct. Vol. 1. No. 3. pp. 3–14.

The writer reviews the subject of "cordons sanitaires" from earliest times and discusses their use in Senegal. He comes to the conclusion that in a thoroughly civilized country where there is medical staff and satisfactory arrangements can be made, the "cordon sanitaire" is not necessary or suitable; but in primitive communities, such as Senegal, it is an extremely useful and advisable measure. "Cordon sanitaire" does not necessarily mean that no one is allowed inside or outside the proscribed area, but all incoming and outgoing are directed to one point where examination, medical treatment, removal of ecto-parasites, etc., can be carried out. The author also points out the considerable educative influence of the cordon.

It is proverbially unsafe to criticize administrative arrangements in a country that one has not visited. Doubtless the writer may be correct in his main conclusion concerning these preventive measures, on the other hand, from a large experience on plague work in other countries in the tropics, we should like to record that we have never yet seen the application of cordons to be of any service whatever; they seldom do what they are intended to do, namely, keep the people inside; they are extremely expensive and otherwise open to objection. We would also point out that the danger of carrying plague about by personal intercourse is extremely small and that in reality it is much more important to look after the movements of such products as grain and bales of goods than the populace itself.

BAKER (C. J.). **Rats in Uganda and their Relation to Plague.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1921.* pp. 38–41. With 1 folding map.

Three species of rat are found in Uganda.

"Rat A.—The 'black rat,' native name 'Nsolima.'

*Rattus rattus.* Nat. Hist. Mus.

"Rat B.—A local house rat, native (Lusoga) name 'Mvugu.'

*Rattus* (*Mastomys*) *effectus.* Nat. Hist. Mus.

„ *coucha panya.* } W. N. van Someren.
„ *coucha ugandae* (?) }

*Epimys* (sp.). Pretoria Museum.

"Rat C.—Local field rat (? vole) native name 'Mese.'

*Arvicanthis abyssinicus rubescens.* Nat. Hist. Mus.

*A. a. nubilans.* } W. N. van Someren.
*A. a. centrosus.* }

*Dasymys orthos.* Pretoria Museum.

"Rat A, I believe to be imported within the last ten years, and it possibly came originally from the coast via the railway; it is generally found in the thatch of the houses but sometimes in burrows in walls made by Rat B.

"Rat B lives either in the thatch or holes in mud walls.

"Rat C burrows in the open but frequents houses in search of food.

"Rat A is larger and more active than either B or C."

The writer goes on to explain that wherever the black rat is found plague occurs sooner or later. He gives the history of several outbreaks which have all been traced to the invasion of black rats usually brought

into the new locality by grain traffic. The cotton districts also provide habitations for the black rat because it makes its nest in the cotton, and lives on the cotton seeds which are scattered about.

Anti-rat campaigns have been started in several areas and in 1921 2,139,471 rats were killed. The accuracy of the figures may be open to doubt, but investigation showed that there has been no serious exaggeration in many parts of the area.

Poisoning has been used at Entebbe and Masaka and the number of rats reduced to 2 per hut ; amongst those killed 4 per cent. still showed infection of plague.

The black rat is almost invariably found in the thatched roofs in houses in this part of Africa. It destroys a great deal of the food supply in the native huts, and an ingenious arrangement has been made to protect the supply as follows :—

" In order to discourage rats on native premises, as an anti-plague measure and to protect the native food supply, I have devised a scheme for rat-proofing these granaries by raising them on poles, which are fitted with rat guards at a height of 3 feet from the ground.

" I had a few samples of these guards made locally from galvanized sheet iron in the form of a disc perforated to receive the pole, and shaped to resemble a lamp shade, the outer and lower edge of the discs being 9 in. horizontally from the pole.

" I had the same idea carried out in pottery, and though these earthenware guards have the disadvantage of being fragile, if fitted closely to the pole they serve the purpose.

" I considered that if metal guards were made by machinery they might be turned out by the hundred thousand at a price low enough to enable the native peasant to purchase them, but the Crown Agents for the Colonies, to whom specifications were sent, can quote no price less than 10d. per guard delivered in London, which, with freight added, would be more than the peasant could afford."

With this article is given an interesting map showing that the plague area and the black rat area almost entirely coincide and that conversely where black rats are absent plague is not prevalent. The plague areas comprise a comparatively small portion of the Protectorate.

White (H. F.). **Plague Suppressive Measures.**—*Texas State Jl. Med.* 1923. Jan. Vol. 18. No. 9. pp. 458–460.

The writer gives an account of the anti-plague measures taken in June 1914 in ports in the Gulf of Mexico. These were mostly aimed at rats and included :—

" (1) Trapping ; (2) wrecking ; (3) fumigation ; (4) outgoing freight, both maritime and overland ; (5) publicity ; (6) special legislation, and (7) rat-proofing."

" By wrecking is meant the removing of rat harborages throughout the whole area, and not alone around the known foci of infection. The removal of the floors in sheds, garages, basement and plank walks, under which the colonies of rats (*Mus norvegicus*) are usually found, will break up the colonies and the trapper will have a better chance to trap the rats."

Experience in America appears to show that plague is not easily eradicated unless there is a combination of wrecking, trapping, and poisoning rats.

Raebiger (H.). **Ueber die rationelle Rattenvertilgung vom hygienischen und ökonomischen Standpunkt.** [A Hygienic and Cheap Method of Exterminating Rats.]—*Cent. f. Bakt.* 1. Abt. Orig., 1922. Oct. 24. Vol. 89. No. 1/3. pp. 156–159.

A description of the Ratin process described in Sanitation Supplements, 1922, pp. 15 and 178.

Ministry of Health, Reports on Public Health and Medical Subjects. No. 14.—**Dr. T. W. Wade's Report to the Welsh Board of Health on the Occurrence of Bacillary Dysentery in the Ogmore and Garw Urban District in the County of Glamorgan.**—24 pp. With 1 map. 1922. London: H.M. Stationery Office. [Price 1s. net.]

In Sanitation Supplement No. 2 of 1922 we reviewed an article by Dr. Murphy on a water-borne outbreak of dysentery in the Ogmore Vale. The official Government report is somewhat fuller than that given by the Medical Health Officer (Murphy). The map gives an idea of the locality and the position of the water mains and of the infected houses at the onset of the disease.

del Rosario (S. V.) & Lopez Rizal (L.). **Contact Infection, the Main Factor in the Causation of Typhoid Fever in Manila.**—*Trans. 4th Congress Far Eastern Assoc. Trop. Med.* 1921. Vol. 2. pp. 298–307.

The authors state that typhoid fever is endemic in the Philippines, the annual incidence being 173·3 per 100,000 of the population. The death-rate ranges from 23·72 to 40·33 per cent., and there is an increased number of cases in the second half of the year. Examination of the official water-supply leads the authors to conclude that:—

"1. Water supply of Manila is safe. Water-borne typhoid as such does not exist in Manila.

"2. Milk is consumed in small amounts and most often boiled before use, there being slight possibility of its being a prominent factor in typhoid causation.

"3. General sewage disposal is likewise safe and has little bearing on the typhoid situation.

"4. Contact infection is the main factor in the occurrence of typhoid and paratyphoid fevers as shown by (1) the estimated and actual infection contracted from cases and healthy carriers; (2) by the infection caused through the agency of milk and water; (3) by the seasonal prevalence of the fly pest."

Granting the correctness of these conclusions the state of Manila is not satisfactory. Personal sanitation and the protection of food from infection, human and by flies, can be controlled with patient insistence.*

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* Summarized by Lieut.-Col. J. H. Tull Walsh.

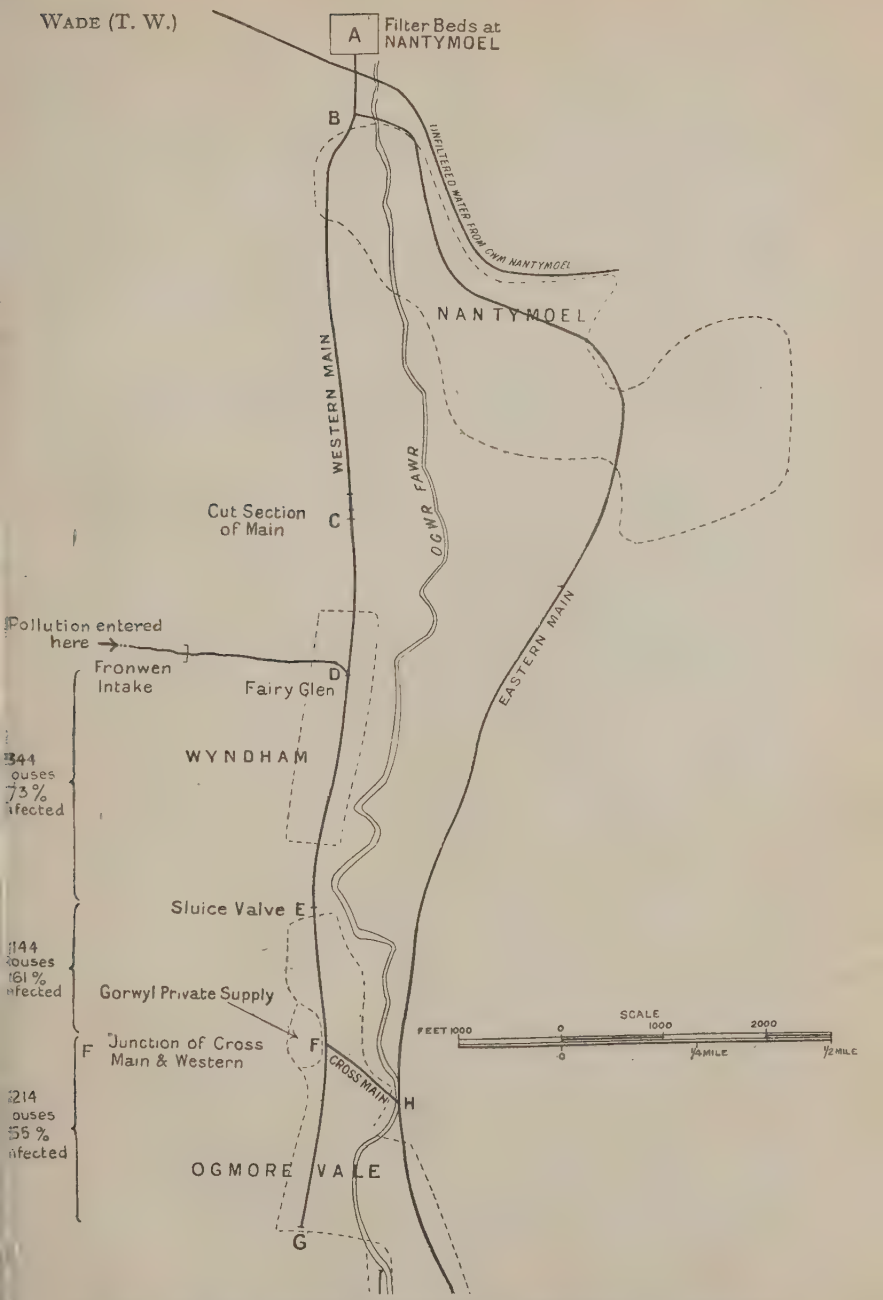



FIG. 40.—Diagram illustrating the system of water mains in the Ogmore valley, and the relative incidence of the Dysentery Epidemic upon the houses along the upper, middle and lower positions of the Western Main. At the onset only 8 houses were infected on the Eastern Main, and of these, 3 were known to have taken water from the Western Main.

[Reproduced from *Reports on Public Health and Medical Subjects*, No. 14, by permission of the Controller of H.M. Stationery Office.]

## CONSERVANCY.

PEACH (John H.). **Sewage Disposal in British Guiana.**—*Jl. Roy. San. Inst.* 1923. Apr. Vol. 43. No. 7. pp. 337–338. With 1 fig.

The writer describes the type of latrine, a rough drawing of which is given, which answers fairly satisfactorily in British Guiana, where the subsoil water level is extremely high. The accumulation of deposits at the bottom of the drain has to be treated with crude oil to prevent flies from breeding in it, and when the drain is filled it is not always easy to dispose of the contents. This difficulty is, however, fairly satisfactorily overcome by digging a hole in the neighbourhood and burying the material with quicklime and crude oil.

The latrine is obviously open to many objections, but it must be remembered that in British Guiana the whole country is below high tide level, and this greatly adds to the difficulties of devising proper sanitary arrangements.

PARSONS (A. L.). **Report on the Clogging of Sewer Pipes by Gordiacea.** —*Milit. Surgeon.* 1923. May. Vol. 52. No. 5. pp. 541–542.

The underground drains of a barrack at Fort Benning, Ga., were blocked by masses of a large Gordiid worm. It is commonly known as the hair worm and lives in ponds. It is approximately 7 or 8, but occasionally as much as 12 in. in length. It has a tendency to form balls or knots, and in this instance one of these balls acted as a sort of obstructive valve in the sewer. The worms were got rid of by the use of chloride of lime and soda.

## WATER.

Flu (P. C.). **Purification of the Water of Javanese Rivers.**—*Trans. 4th Congress of the Far Eastern Assoc. of Trop. Med.* 1921. Vol. 1. pp. 556–557.

"The author's experiments and efforts to change the turbid water of the lowland rivers of Java into a clear and bacteriologically pure drinking water may be summarized in the following conclusions :—

"A. It is impossible to obtain satisfactory results by following the method of filtration described by the French engineers Puech and Chabal. The colloidal clay which is the cause of the turbidity of the water passes through the sand filters of their plant.

"B. Very good results can be obtained by treating the turbid water with sulphate of alum. Subsequent filtration of the absolutely clear water, which has been treated with alum, through slow sand filters, gives a water of high standard as regards physical and bacteriological properties.

"C. (1) But satisfactory results can only be obtained in this way when direct sunlight can shine on the surface of the sand filter.

"(2) When that surface is kept dark or even in diffused daylight the bacteriological results are unsatisfactory.

"(3) During his experiments the author could never observe an abundant or even pronounced growth of algae on the upper layer of the sand.

"Probably this result is due to the fact that much of the organic matter and the protozoa and algae are removed from the raw water by the precipitation by alum.

"It is clear that when naturally clear water is filtered in the tropics the results as regards the 'film' may differ from the author's.

"D. The water analyst can and must desire that in the tropics filtrates from slow sand filters correspond to the same standards as in Europe, *i.e.*, :—

"(*a*) One hundred colonies or less by plating one cc. of the filtrate.

"(*b*) No fermentation of glucose in 6 or 8 out of 10 tubes of glucose water, each mixed with 10 cc. of the filtrate and incubated at 45° C., or no fermentation of glucose under the same condition by 50 cc. of the water examined in one single tube.

"(*c*) No lactose fermenting organisms in 50 cc. of the filtrate.

"E. Presuming good management, a ripe sand filter in the tropics is able to destroy practically all pathogenic germs contained in the raw water."

BOMBAY. **Fifty-eighth Annual Report of the Director of Public Health for the Government of Bombay, 1921, with Appendices including the Annual Report of the Sanitary Board, Bombay Presidency, and the Annual Reports of the Health Officers of the Ports of Bombay, Karachi, and Aden.** [MURPHY (W. O'S.), Director of Public Health.]—46 + 57 pp. With 4 diagrams. 1922. Bombay: Govt. Central Press. [Price Re. 1–7–0.]

A chart showing the effects of piping water supply in diminishing infant mortality and deaths from dysentery and diarrhoea in Sholapur City is reproduced.

COMPARISON OF TOTAL DEATHS, DEATHS FROM INTESTINAL DISEASES AND DEATHS OF CHILDREN FOR PERIODS BEFORE AND AFTER INSTALLATION OF PIPED WATER SUPPLY IN SHOLAPUR TOWN.

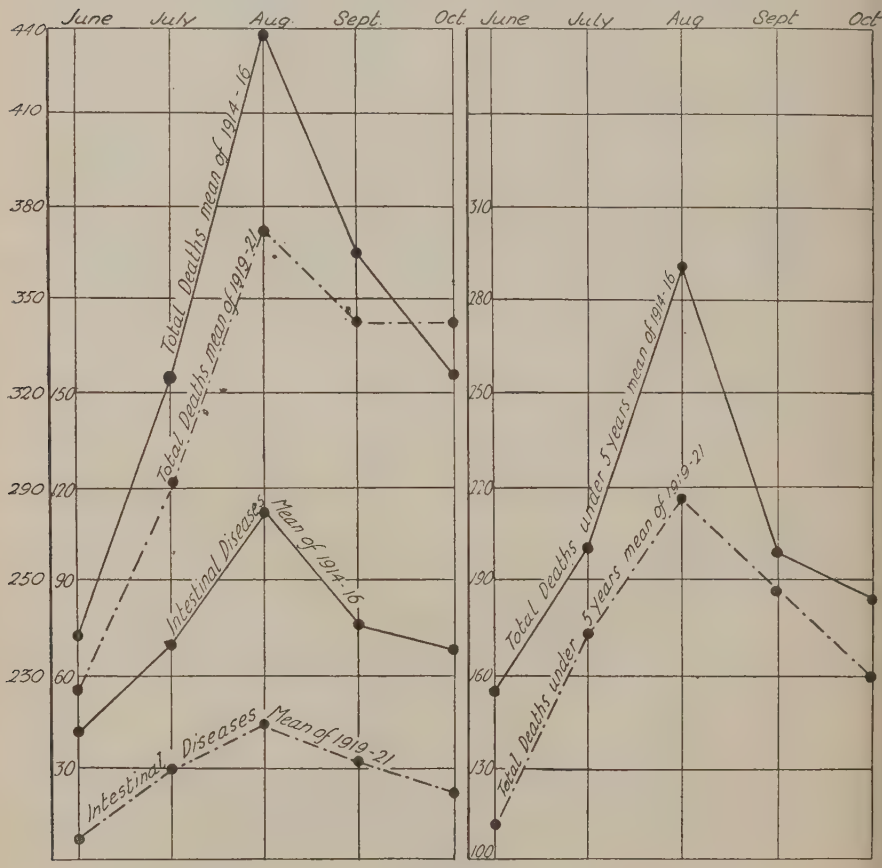



FIG. 41.

Mean of total deaths (excluding epidemic diseases) and of intestinal diseases for the 3-year periods 1914–16 and 1919–21 during the monsoon months.

Mean of deaths under 5 years for the 3-year periods 1914–16 and 1919–21 during the monsoon months.

Year 1917 omitted as pipe-line was laid in that year. Year 1918 omitted on account of influenza during this period.

INDIAN ENGINEERING. 1923. Feb. 24. Vol. 73. No. 8. pp. 122–123. With 1 plate.—**Largest Pipe Line in the World.**

"The main features of the Tansa completion works comprise :—

"(1) The construction of an embankment with cuttings to form a track from Tansa to Bandra along which the pipes can be laid. This track is about 50 miles in length by 30 feet in width at formation level and is provided with a tramway of 2 feet 6 inches gauge for the transport of pipes and materials. Three of the cuttings are large, extending from 1,800 feet to 3,400 feet in length and up to 45 feet in depth, a large proportion of which is through hard rock. The smaller rivers are crossed by masonry bridges, and road bridges and other accommodation are provided to give access for traffic across the track where required.

"(2) The building of steel bridges across the Bassein and Bandra creeks, the largest being 1,800 feet long and 60 feet wide.

"(3) The laying of two 57 inches diameter steel pipes through the island of Bombay from Mahim Causeway to Malabar Hill and Bhandarwada reservoirs.

"(4) The manufacture, supply, transport, and laying of about 81 miles of 72 inches diameter, 29 miles of 57 inches diameter, and 3 miles of 60 inches diameter riveted steel pipes together with the supply and erection of sluice valves, air valves, Venturi recording meters, and other appurtenances.

"(5) The remodelling of the distribution system of water supply within Bombay.

"(6) The raising of Tansa dam.

"(7) The building of a new outlet well at Tansa dam.

"(8) The filtration of water from Tansa Lake.

"(9) The removal of the villages within the Tansa catchment area.

"(10) The supply and erection of a low-lift pumping installation to make up the loss of pressure from fluctuations in the water level of Tansa Lake.

"(11) The construction of a service reservoir of about 4½ million gallons on Sion Hill.

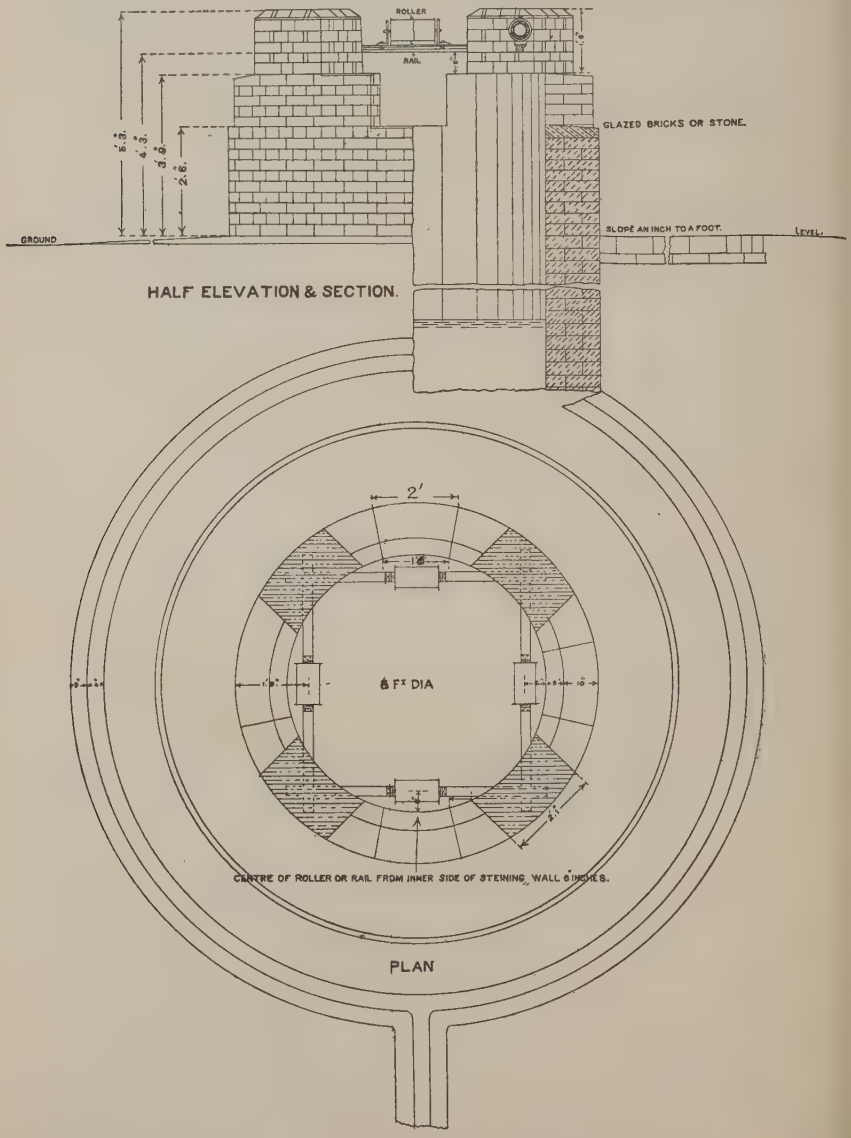
"The *magnum opus* of the scheme is the manufacture and laying of the steel pipes."

ASANSOL, BENGAL. **Annual Administration Report of the Asansol Mines Board of Health for the Year 1921–22.**—[TOMB (J. W.), Chief Sanitary Officer.]—74 pp. With 8 diagrams & folding plans. 1922.

*Specification of Sanitary Well Parapet, No. 1.*

The parapets should be constructed of brick-in-lime mortar. Only first-class materials should be used and the work should be executed in a careful and workmanlike manner. The steining wall should be 1 ft. 3 in. thick and the parapets 3 ft. 9 in. in height above the platform. The openings of 1 ft. 6 in. at the inner face and 2 ft. at the outer face of the steining wall should be made for facility of taking out the buckets at a height of 2 ft. 6 in. above the platform. The tops of parapets should be levelled 5 in. at the inner face of the steining wall and then sloped 1 in. to a foot outwards. *Glazed bricks or stones set in cement mortar should be placed in the openings for the buckets as shown in the plan.* The pillars are to be 2 ft. 1 in. long. 1 ft. 3 in. broad and 1 ft. 6 in. in height above the parapets. The iron rails are to be placed at a height of 4 ft. 3 in. above the platform or 6 in. above the parapet with tops downwards.

Six-inch diameter anti-friction or wooden rollers are to be fixed on the rails and the clearance between the rails and rollers should not exceed 1 in. *The centre of the rollers or rails should be at a distance not exceeding 6 in. from the inner face of the steining wall.* The dimensions given below should be strictly followed and the *anti-friction rollers or wheels should be fitted on to the rails before the latter are built in.* A brick-on-edge platform over a layer of brick flat with a slope of an inch to a foot should be provided. A catch water drain with an outlet should also be provided for the discharge




Asansol Mines Board of Health.

Fig. 42.—*Model Plan of Sanitary Well Parapet, No. 1.*

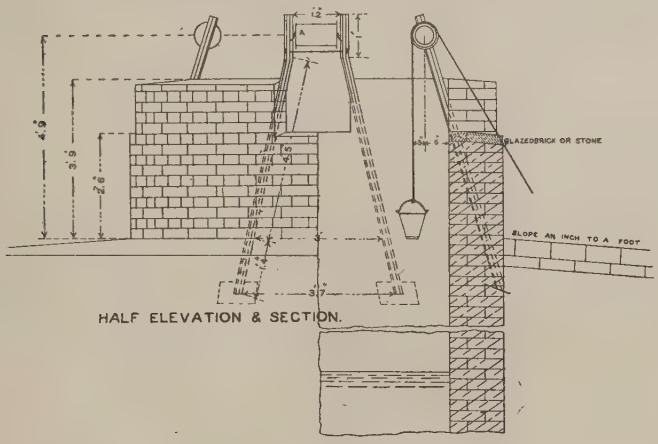
of spill water. The parapets, pillars and platforms are to be pointed with cement and sand.

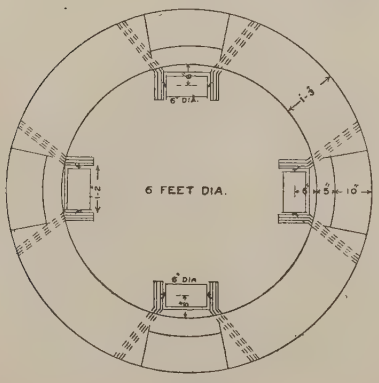
| | *ft.* | *in.* |
|---|---|---|
| Total height .. .. .. .. .. | 5 | 3 |
| Height of parapet .. .. .. .. .. | 3 | 9 |
| Height of bottom of rail above platform .. | 4 | 3 |
| Height to opening .. .. .. .. .. | 2 | 6 |
| Distance of centre of rail or anti-friction rollers from inner edge of steining wall .. .. | 0 | 6 |

*Specification of Sanitary Well Parapet, No. 2.*

The specifications should be the same as that of Parapet No. 1 except that the anti-friction rollers or wheels are to be fixed on two rails placed at an inclined position so that the centre of roller shall be at a distance of 6 in. from the inner face of the steining wall. The maximum length of the rails should be fixed in the brickwork, as shown in the plan. The tops of the rails should bend at an angle so that the rollers can be fixed properly between the flanges of rails. A mild steel plate should be fixed at the base of each rail. The dimensions given below should be strictly followed.

| | *ft.* | *in.* |
|---|---|---|
| 1. Height of centre of pulley above platform .. | 4 | 9 |
| 2. Height of parapet above platform .. .. | 3 | 9 |
| 3. Height to opening .. .. .. .. | 2 | 6 |
| 4. Distance between the centre of pulley and the inner face of steining wall .. .. | 0 | 6 |



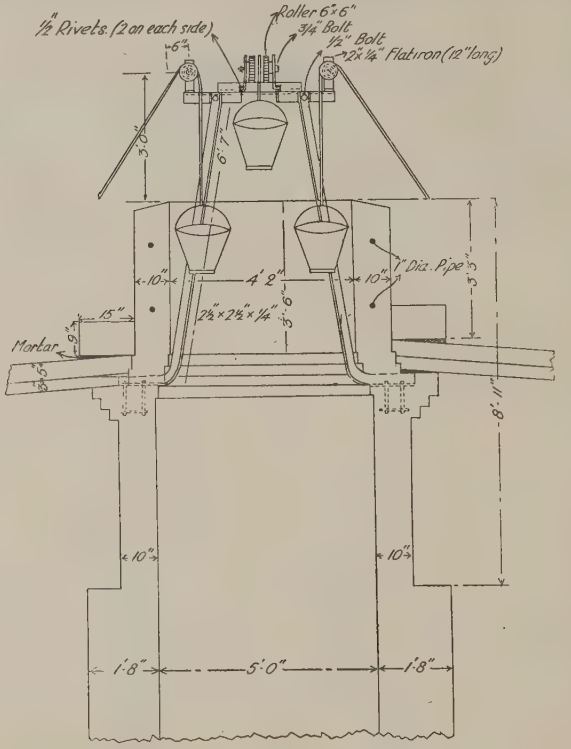




PLAN

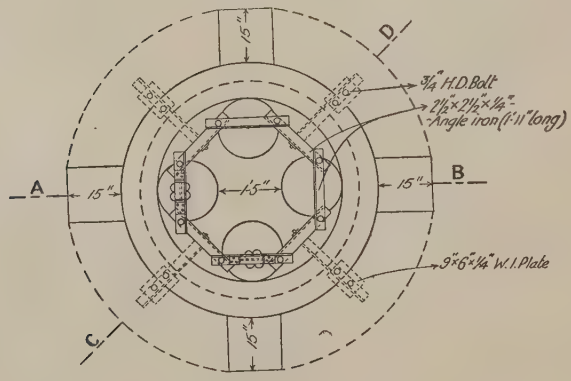
ASANSOL MINES BOARD OF HEALTH.

FIG. 43.—*Model Plan of Sanitary Well Parapet, No. 2.*

An Indian sanitary type plan of a well, issued by the Sanitary Commissioner, Bihar and Orissa, is here reproduced for comparison.




SECTION ON A. B.




PLAN.

FIG. 44.—INDIAN SANITARY TYPE PLANS. WELL.

[*Issued by the Sanitary Commissioner, Bihar and Orissa.*]

RAGHAVA CHARI (T. N. S.). **The Inapplicability of the "Mills-Reincke Phenomenon" to Indian Conditions.**—*Indian Jl. Med. Res.* 1923. Apr. Vol. 10. No. 4. pp. 965–978. With 4 charts. [4 refs.]

"The 'Mills-Reincke phenomenon' and 'Hazen's theorem' may be defined as an expression of the indirect benefit conferred on a community by a protected water supply. Apart from the decline in the mortality from a specific water-borne disease, such as typhoid fever, which is to be expected under such conditions, the sponsors of the phenomenon maintain that there is also a decline in other diseases not necessarily water-borne. In HAZEN'S own words: 'where one death from typhoid fever has been avoided by the use of a better water, a certain number of deaths, probably two or three, from other causes has been avoided.'"

The writer examines the theorem from the point of view of Indian conditions and naturally comes to the conclusion that Indian statistics do not support it. For satisfactory results to be obtained the following conditions are necessary:—

(1) The existence of a definite water borne disease with an appreciable mortality.

(2) An accurate record of the total death-rate.

(3) An accurate record of the death-rate due to certain individual diseases both water borne and non-water borne.

(4) The existence of a fully protected water supply.

The 3rd and 4th of these do not obtain in India; therefore the results are not likely to be of value. The charts given by the writer confirm this opinion.

It may also be pointed out that although it is well known that even a partially protected water supply is extremely beneficial in reducing cholera in any town, it often has little apparent effect on the diarrhoea and dysentery rate. In Bengal three places which have really satisfactory water supply all the year round are Calcutta, Howrah and Darjeeling, and these three places head the list for dysentery and diarrhoea; the explanation being that deaths are properly recorded in these towns, whereas only about one third or a quarter of the dysentery and diarrhoea is registered as such from the districts.

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## SMALLPOX VACCINATION.

HARVEY (W. F.) & CHRISTOPHERS (S. R.). **Small-Pox Vaccination in Java.**—*Indian Jl. Med. Res.* 1923. Jan. Vol. 10. No. 3. pp. 754–758.

The writer gives an interesting account of the successful vaccination started by Dr. NIJLAND in Java. In order to prevent attenuation of the vaccine virus, the lymph is passed through a series of animals. First a rabbit is inoculated, the product of this is passed on into a cow calf, from which a stock lymph is made, and finally a buffalo calf is inoculated from this stock to produce the paste for field work.

The paste received from the buffalo is ground up and diluted with glycerine two parts to one part of crude pulp. The mixture is allowed to remain for seven days at room temperature to undergo purification

and is then filled into capillary tubes by a vacuum apparatus, similar to the one designed some years ago by Lieut.-Col. Entrican, I.M.S. The tubes are sealed.

The vaccinator again dilutes this concentrated lymph with 1 in 7 or 1 in 10 dilute glycerine. The writer says that the crude lymph will stand a dilution of 1 in 100 and still prove effective. This fact is an important one, as it allows of satisfactory provision for sudden and emergency demands.

The lymph is sent out to vaccinators in capillary tubes drawn out at either end to a very fine point so that they are easily broken. They are packed in corrugated paper, which is rolled up and pushed into a bamboo. A bundle of pen-nib lancets (ready sterilized) is packed in the same tube.

The vaccinator possesses a small brass portable sterilizing apparatus, which consists of sterilizing kettle, lid, basket and wind-screen, serving also as a stand and a spirit lamp.

A small black porcelain slab with a depression into which the lymph is poured for dilution is very simply sterilized by pouring over it some methylated spirit and setting fire to it. A fresh pen-nib lancet is used for each person. Linear incisions are made, one only on each arm and of 2 cm. length. The total length of inoculated incision is thus 4 cm. per individual.

del Rosario (S. V.) & Lopez Rizal (L.). **Some Facts about Vaccination in the Philippines.**—*Trans. 4th Congress of the Far Eastern Assoc. of Trop. Med.* 1921. Vol. 1. pp. 525–534.

The following items of this paper may be noticed :—

" (*a*) The dried pulverized vaccine gives uniformly over 60 per cent. positives in primary vaccinations. This seems to be a confirmation of what has been found in Uganda, where the percentage of results obtained from using different kinds of vaccine is : dessiccated vaccine, 66 per cent. ; lanolized vaccine, 91·32 per cent. ; glycerinated vaccine, 67·32 per cent.

" (*b*) The vaccination with either glycerinated or dried vaccine in one-month-old children gives around 60 per cent. positives.

" (*c*) Dried pulverized vaccine as prepared in the Philippines may be kept potent up to four months old."

Cohen (H. M.). **Small-Pox and Vaccination in the Philippines.** [Correspondence.]—*Brit. Med. Jl.* 1923. Feb. 3. p. 210.

A good deal has been written about the recent epidemic of smallpox in the Philippines. The following extract from a letter written by an officer who was present in the Philippines during the early years of this century is of considerable importance :—

" Before the American occupation there had been an annual smallpox mortality of something like 40,000. . . .

" In 1902, the backbone of the insurrection having been practically broken, and when medical officers could be spared for the work, an energetic vaccination campaign was inaugurated which extended throughout the principal islands. At the same time all discovered cases were isolated.

" How well this work succeeded—and this is the true practical demonstration of the value of vaccination in the Philippines—is shown by the statement that ' the 19,000 deaths in 1903 fell to 9,000 in 1904, to 4,000 in 1906, to 3,000 in 1910, to 1,000 in 1911, and to a

few hundreds annually from 1912 to 1916.' Can anyone doubt that this remarkable decline was due to the campaign of vaccination inaugurated in 1902? . . .

"But how are we to account for the sudden jump in 1918 to 14,574 and in 1919 to 45,873 deaths? The Rockefeller Foundation survey now being made will no doubt elucidate the matter, but one is inclined to think that in considerable measure changed conditions of government will prove the key to the solution of this mystery. As the islands became more peaceful there was a gradual transfer of government into the hands of the natives themselves and a consequent withdrawal of Americans, and with them practically all their medical men, military and civilian. The supervision, direction, and execution of vaccination and other sanitary undertakings were assumed by the Filipinos themselves, and one is inclined regretfully to conclude that the work was no longer of a sufficiently high standard to continue the successes obtained by their predecessors."

CUNNINGHAM (J.) & CRUICKSHANK (J. A.). **The Necessity for a Standard for Vaccine Lymph, with the Description of a New Test.**— *Indian Jl. Med. Res.* 1923. Apr. Vol. 10. No. 4. pp. 1127–1135. With 1 fig.

This paper deals with a method of estimating in the laboratory the potency of ordinary vaccine lymph.

The writers point out that at present there is no satisfactory method of doing this. Care is, of course, taken with the stock strain used and with the form and character of the vesicles for supplying the lymph, but these methods are unsatisfactory and give no sort of idea as to the real quality of the lymph itself.

The writers' method of procedure is given in their own words and the picture explains the process.

"We take advantage of the fact that lymph, when suitably diluted, will produce discrete vesiculation, and we assume that, if thoroughly ground in the first instance, each vesicle is analogous to a bacterial colony and can be taken as the product of a single virus or collection of 'viruses.' Our method is thus an application of the colony count method of enumerating bacteria. To this we have added the estimation of the weight of the pulp removed so as to test the value of this method also.

"Our procedure is briefly as follows: A suitable number of dilutions is made from the lymph to be tested. Each of these is sown on a calf in a series of horizontal lines about 2 or 3 inches long so as to form a number of columns, each column representing a single dilution (see fig. 45). The method of seeding and the quantity of lymph used is as near as possible the same in each case. When ready for removal the dilutions in which discrete vesiculation has occurred are noted, the vesicles are counted, the lines measured and the pulp removed and weighed. The results are expressed as the number of vesicles and the yield of pulp per linear inch. When two batches of lymph are being compared, the abdomen of the calf is divided longitudinally into two equal parts. Each sample is confined to one half, and the dilutions are sown in corresponding positions, so that differences due to variation in development in different areas may be avoided. It will be noted that the exact quantity of seed sown is not measured. We are of opinion that this factor may be neglected as far as linear sowing is concerned, provided that sufficient lymph is used in each

case. A single line represents in reality a very small area and can only absorb a certain quantity of lymph. If, therefore, sufficient opportunity for absorption be given the error arising from this source must be very small. This point is borne out in our experiments."

In order to test the consistency of this method eight calves were selected and inoculated with two samples of lymph, one side of the abdomen being set apart for each; dilution up to 1 in 1,000. The rate of vesiculation and the weight of the lymph were taken. Results given in tabular form (which are not printed) show that both the number of vesicles and the weight were very similar on the different animals. In many instances in the stronger dilutions discrete vesicles are not obtained; consequently the value of the results from the higher dilutions are usually more reliable.

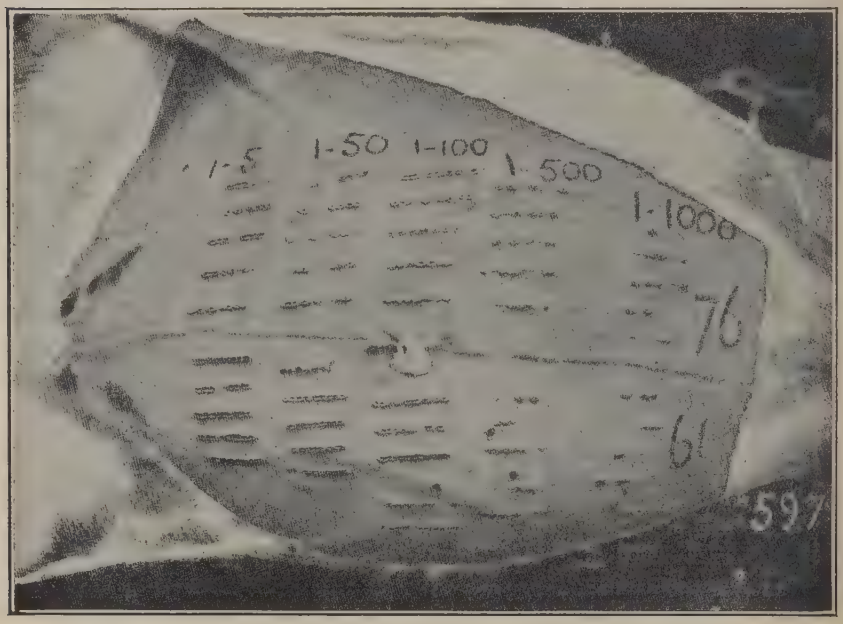


FIG. 45.—The abdomen of the calf has been divided longitudinally, and two samples of lymph have been sown thereon. The method of seeding can be seen, also the discrete vesiculation in the higher dilutions.

[Reproduced from the *Indian Journal of Medical Research*.]

The writers point out that a heavy yield of pulp does not necessarily mean that the strain is a good one. This, of course, is known to all who are familiar with the manufacture of calf lymph. The method was also tested on 46 different batches of lymph supplied to vaccinators and 1,327 persons were actually vaccinated. The results in the main support the other figures.

We recommend all interested in the preparation of lymph to obtain a copy of this paper as it is hardly possible to do justice to it in a review.

## DISINFECTION.

GRUBBS (S. B.). **Fumigation of Vessels from Plague-Infected Ports. Observations with Especial Reference to the Necessity for fumigating Crates and Similar Cargo.**—*Public Health Rep.* 1923. Jan. 12. Vol. 38. No. 2. pp. 59–63.

This paper emphasizes the importance of proper fumigation of a certain class of cargo coming from plague-infected ports. Crates of fruit, onions, vegetables, etc., frequently harbour rodents, which are brought ashore unless the cargo is properly fumigated either on board ship or in the lighters.

The writer appears to have used only hydrocyanic acid, which gives most excellent results in this class of work. Sulphur dioxide has been employed, but it requires a longer exposure and does some injury to the cargo.

In this instance all perishable cargo from Porto Rico and the Canary Islands was fumigated, and the writer describes the procedure adopted.

"1. On arrival, the boarding officer obtains a cargo stowage plan and notifies the chief of the fumigation division, who personally boards the vessel and examines the manifest and holds to see if the vessel can be fumigated without removing any cargo.

"2. Immigration and custom officials are permitted to board the vessel to complete their work.

"3. Ship is held in stream on day of arrival and not permitted to dock until early next morning.

"4. If not prepared to fumigate at this time, on account of deck cargo or holds that are filled to hatch coaming, the ship may discharge the deck cargo and barrelled or case goods from the holds until the square of the hatch is clear, during daylight hours under the supervision of a guard.

"5. Ship to pull out in stream at 4 p.m. if not fumigated the same day.

"6. Fumigation of whole ship to be started promptly at 9 a.m., when the ship is prepared, four hours' exposure, and prolonged blowing out with aerothrust. When possible, the generating machine on the fumigating tug Von Ezdorf is to be used in conjunction with the usual method, the hose from the generator to be inserted into a ventilator opening to get gas beneath cargo at the same time it is generating in the square of the hatches.

"7. The day following fumigation, two fumigators are to stand by with gas masks to recover additional rats or to run aerothrust if stevedores complain of gas while working cargo.

"8. In event of live rats being seen by guards on watch, during discharge of cargo, the discharge is to be stopped and the vessel refumigated. This fractional fumigation is to be repeated at any time when in the opinion of the fumigating officer the cargo is such that the gas will not penetrate thoroughly.

"9. When holds are completely filled with cargo that may harbour rats, such as bags of almonds or crates of vegetables, enough cargo must be discharged into lighters to permit the fumigation of the ship, the lighters to be fumigated when loaded.

"10. When the ship in question carries cargo and passengers in transit it will be treated as follows:—

"(*a*) Either ship will remain in stream, where New York cargo will be discharged into lighters and fumigated, or

" (*b*) The ship may go to the dock if holds are not completely filled with cargo and be fumigated there after crew and passengers have been removed.

" 11. Ship, in all cases, to be fumigated throughout after complete discharge of cargo."

LISTON (W. Glen) & GORÉ (S. N.). **The Fumigation of Ships with Liston's Cyanide Fumigator. (Its Safety and Efficiency compared with the Dumping Fixture.)**—*Jl. of Hyg.* 1923. May. Vol. 21. No. 3. pp. 199–219. With 4 plates & 3 plans.

In Sanitation Supplement No. 1 of 1921 an article by the senior author was noticed on the use of HCN as a disinfectant for clothes, etc. The paper under review deals with HCN in ships. The apparatus has been considerably improved, and we give pictures of the plant. Those interested should consult the original paper for a detailed description and the method used, as it is somewhat long and not adapted for review.

The apparatus was thoroughly tried on board the R.I.M.S. "Canning," and the comparison was made with the simpler method used in America, namely, that of the "dumping fixture" [we gather this consists of a tub of acid placed in the hold of the boat into which KCN in a calico bag or sack is lowered by means of a rope].

Many careful experiments were made to determine the concentration of gas in various cabins of the ship under treatment. The writers' conclusions are given below:—

" 1. These experiments prove that the fumigator is safer to use than the dumping fixture, because high concentrations of the poison gas are avoided, so that dangerous pockets are not developed.

" 2. The poison gas is more evenly distributed over the different parts of the section of the ship under treatment.

" 3. High concentrations, however, can be developed at will in any part which requires special attention.

" 4. The maximum concentrations of the poison gas were obtained in every part of the section in a shorter time when the fumigator was used than when the dumping fixture was employed.

" 5. The artificial ventilation caused by the fan, which is capable of blowing into the section 500 to 1,000 cu. ft. of fresh air per minute, according to the speed of the motor, materially assists the rapid clearing of the poison gas from the ship after it has accomplished its work. It is thus possible to complete the fumigation and ventilation of a ship in three hours, using the cyanide fumigator, while more than four hours are required for the dumping fixture.

" 6. Even more important is the fact that smaller quantities of cyanide can be used, with greater efficiency, in the fumigator than larger quantities, with less efficiency, in the dumping fixture.

" 7. The general conclusion is arrived at, that, from the point of view of efficiency, safety and economy, the fumigator is superior to the dumping fixture. Creel has shown that, in respect of the time required for completing the fumigation and in respect of the thoroughness of the process both in killing rats and insects, the dumping fixture is superior to the Clayton gas machine. It follows, therefore, that the cyanide fumigator is very much superior in these respects to the Clayton gas machine."

Fig. 46.—Shows motor, fan and chemical cabinet placed on the generating box. The attachments for the inlet and outlet pipes, as well as the sloping channel on which the fluids are mixed within the generating box are shown as they are packed when covered by the generating box, *i.e.*, not in their working position.

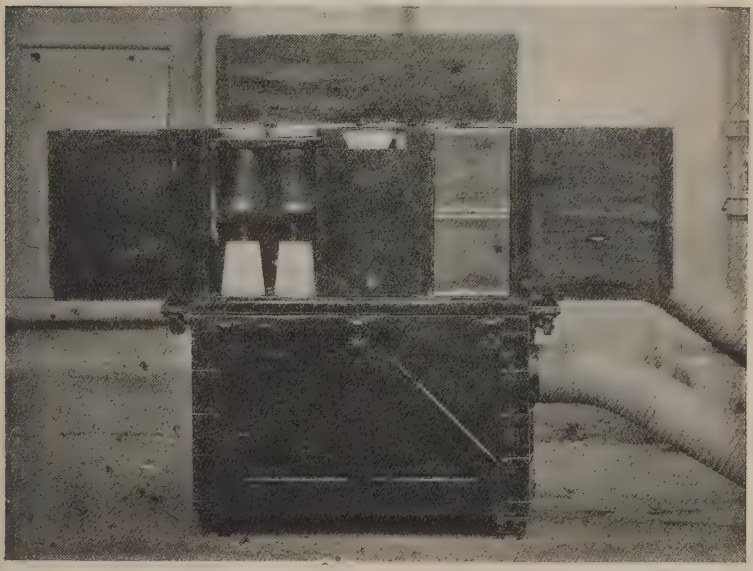

Fig. 47.—Shows the chemical cabinet opened but not unpacked. The inlet and the outlet pipes are attached in the working position.
[Reproduced by permission from the *Journal of Hygiene*.]

ANDERSON (L. A. P.). **A Note on a Method of Fumigation by Hydrocyanic Acid Gas on a Small Scale.**—*Indian Jl. Med. Res.* 1923. Apr. Vol. 10. No. 4. pp. 1119–1122. With 2 figs.

The accompanying figures give details of a rough and ready method of ridding grain from weevils by the use of hydrocyanic acid.

The figures show a large packing case carefully made gas-tight with paper strips and the apparatus for generating the HCN, namely, two ordinary laboratory flasks. The gas is introduced at the bottom and distributed by rubber tubes. The grain is placed on light wooden trays in the box and a gas outlet left in the lid for the escape of air and the surplus HCN. Three and a half to four hours is sufficient to kill all the weevils and also their eggs, for the grain was kept for three months after fumigation and was not reinfested. Grain treated in this way did not lose its power of germination.

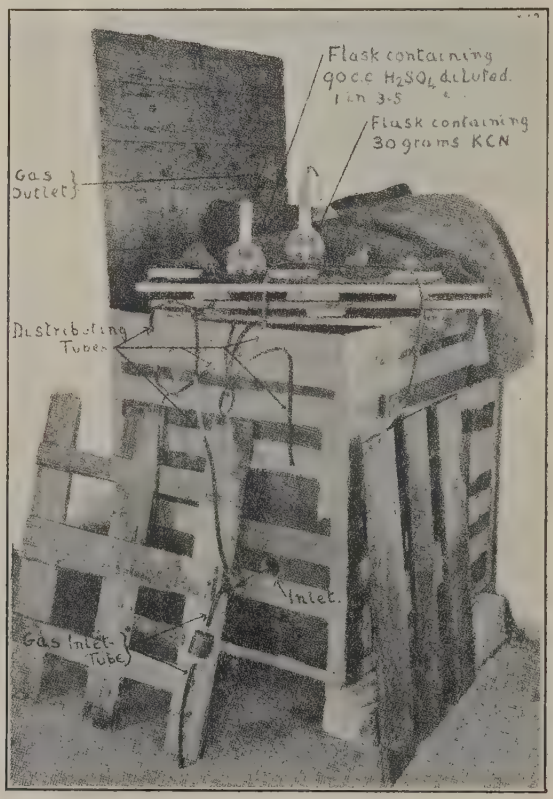


FIG. 48.—Showing apparatus for fumigating grain. Note wooden trays and some of the rubber and glass distributing tubes. The grain is placed on empty sacks laid over the trays.

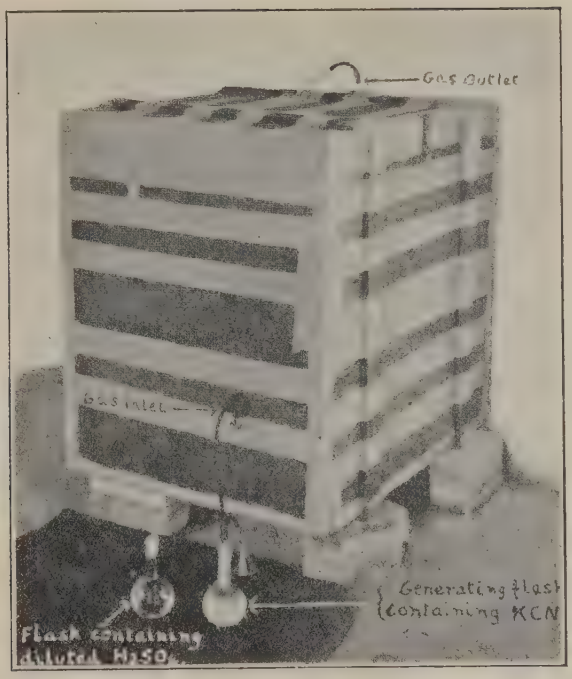


Fig. 49.—Showing apparatus ready for fumigation. The generating flask is attached to the main inlet tube leading to the system of distributing tubes arranged inside the box. The box lid has been closed and sealed.

[Reproduced from the *Indian Journal of Medical Research*.]

Joffick (S. D.). **A Practical Method for Delousing Chinese Clothes and Bedding.**—*China Med. Jl.* 1923. Jan. Vol. 37. No. 1. pp. 25–33. With 4 figs. [20 refs.].

The writer describes a method of delousing clothes by use of the ordinary Chinese bread steamer oven, found in most houses in China, illustrations of which are given. It is very like the ordinary contact steam sterilizer. It has been found by experiment to work extremely well with exposures of one, three-quarters, and half an hour. The fuel ordinarily used (kaoliang stalks) is very cheap and can be got everywhere.

## REPORTS AND STATISTICS.

BALFOUR (Andrew) [C.B., C.M.G., Director-in-Chief, Wellcome Bureau of Scientific Research]. **Report on Medical and Sanitary Matters in Mauritius. 1921.**—pp. vii + 168. With 130 figs. & 3 maps. 1922. London Waterlow & Sons, Ltd., London Wall. [Price not stated.]

*Malaria in Mauritius.*

We have reviewed in Sanitation Supplements, 1922, pp. 44, the interim reports by Dr. Balfour on sanitation in Mauritius. Here we have a comprehensive volume dealing with the whole subject, together with many fine illustrations. It is impossible to do justice to this detailed report, but it appears desirable to say a little more on the subject of malaria.

It is of course well known to everybody that Sir Ronald Ross visited the Colony in 1907 and made certain recommendations for the control of the disease. He advised that a careful spleen census should be made to find out (1) localities most affected by malaria; (2) the effect of preventive measures; (3) the children who require most treatment. Many of his recommendations were carried out, but Dr. Balfour points out he is sure that Ross did not recommend the spleen examinations being made through the clothes. This is a slipshod way of doing the work, and the figures so collected are of doubtful value. Apparently, also, little or no notice was taken of the truth that several diseases may give rise to enlargement of the spleen, particularly the presence of worms in the intestinal tract, a cause which was discovered as long ago as 1874 by MACGREGOR.

The distribution of quinine to school children was also a great plank in Sir R. Ross's programme. This was in the hands of the schoolmaster, who received a bonus of Rs.10 every six months if he obtained a reduction of 50 per cent. of children with enlarged spleen. The same reward was given to quinine distributors in villages. As is usually the case in anti-malarial measures, anti-mosquito measures were carried on concurrently; consequently it is extremely difficult to say how much of the improvement was due to these and how much to the use of quinine. But as time went on the enthusiasm for the distribution of quinine greatly lessened and the work is now inefficient. Further, the quinine taken by each patient was certainly insufficient to bring about complete cure.

As regards screening of houses little or nothing was done. The Central Jail and the Royal African Observatory appear to have been protected, but the gauze has fallen into disrepair.

As regards mosquito reduction Dr. Balfour's report adds a great deal to our knowledge. The carrier of malaria in Mauritius, and apparently the only one, is *Anopheles costalis*. *A. mauritianus* is plentiful, but apparently does not carry the disease. *Maculipalpis* is very rare and is certainly not an important factor.*

* In a report recently received from Mr. M. E. MACGREGOR, which the Editor has seen by the courtesy of Dr. BALFOUR, Mr. MACGREGOR points out that *maculipalpis* is far from being rare, but its larvae are apt to be mistaken, without microscopical examination, for those of *costalis*. Mr. MACGREGOR has made the important discovery that *A. funestus* is present in Mauritius in addition to the species of Anopheles already known. It is restricted to altitudes below 500 feet, but as it is found in Africa up to 5,600, there is no reason why it should not overrun the Island. He suggests that it is of comparatively recent introduction. Mr. MACGREGOR proved by experiment that this species can carry malaria in Mauritius.—[ED.]

The larvae of *costalis* are never found in places where there is shade, because the green algae on which it feeds require sunlight.

Consequently if the rivers and streams could be shielded with the jamrosa tree many of the present breeding-places would be rendered useless to the mosquito.

During his visit Dr. Balfour discussed the whole subject with the River Reserve Board and certain recommendations were agreed upon, the most important being that the Government should take control of these river reserves and that trees to a depth of 10, 25 and 50 ft., according to the size of the watercourse, should be planted.

The operations comprised the prevention of tree-felling in the riparian areas and the restocking of the reserves with suitable trees.

Another important point made by Dr. Balfour is that during the cold weather *Anopheles costalis* larvae and imagines are extremely rare. The number of breeding places is not excessive in the dry season, and he considers that they could then be dealt with.

" The majority of the actual and potential nurseries are well-known and many are already charted. Most of them are nowadays easy of access and in the winter the conditions of work are agreeable. It must not, however, be imagined that the campaign will be either simple or easy. It will mean hard and unremitting, if straightforward work, and in some districts heavy rainfall may prove a disturbing factor. The attempt will not be successful unless it is thorough, but if it is thorough, then the game would appear to be worth the candle owing to the unique conditions obtaining.

" If the adult female mosquitoes are found to hibernate, it might be feasible to destroy them *in situ*, possibly along the lines employed with success by Sella in Italy in the case of *A. maculipennis*. The existence of hibernation would, I fear, complicate the problem, but I very much doubt if it occurs. At the same time Dr. Marshall informs me that there is some evidence of *A. costalis* hibernating in Africa. It is not, however, very convincing."

. . . . .

" Other recommendations made in the interim reports deal with the establishment of a Malaria Diagnosis Centre in Port Louis, the use of trap pools for the purpose of gaining information as to the prevalence and movements of anophelines, the employment of petroleum fire-sprays like those used by the Americans in Panama, the introduction of cresol as a larvicide, the necessity for extensive clearing operations in the vicinity of Port Louis, the utilization of animals, more especially cattle, as providers of blood feeds for anophelines, the deepening of certain swamps, the introduction of sluices into dams for the purpose of scouring depleted sections of rivers and streams, the possible value in certain localities of the ' vertical drainage ' successfully employed in Alabama, U.S.A., the cultivation of sunflower in certain places, and the revision of the existing law."

It has also been suggested to introduce *Anopheles rossii* and *Culex tigripes* in order to combat and oust the *costalis*. *C. tigripes* is known to be extremely voracious and to eat small anopheles larvae. It is supposed not to attack man. It seems doubtful whether these recommendations will be carried out.

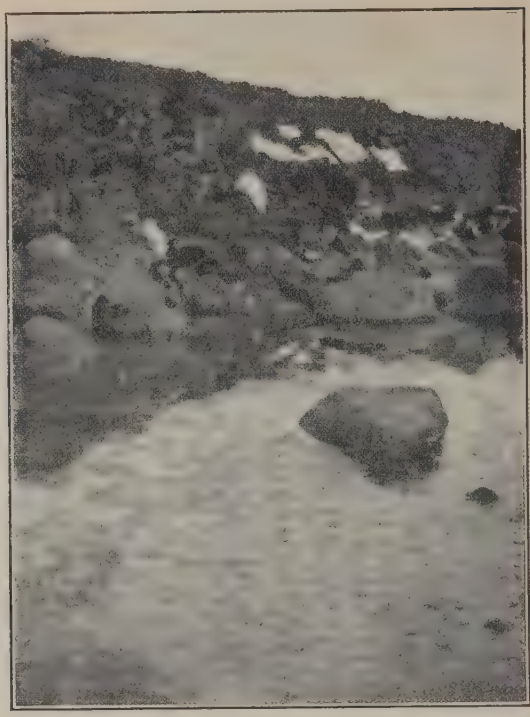

Fig. 50.—Growth of water weed in a depleted river forming a favourable nursery for *A. costalis*.

Fig. 51.—Subsoil water spreading over Pavé. In this shallow water the larvae of *A. costalis* were found.

FIG. 52.—Cresol drip placed over an irrigation channel.

FIG. 53.—Canalized banks of the River Oragon. Black River District.

Fig. 54.—Shells of a land snail forming breeding places for *Stegomyia*.

Fig. 55.—Engrais buildings at Curepipe, showing mass of town refuse in foreground.

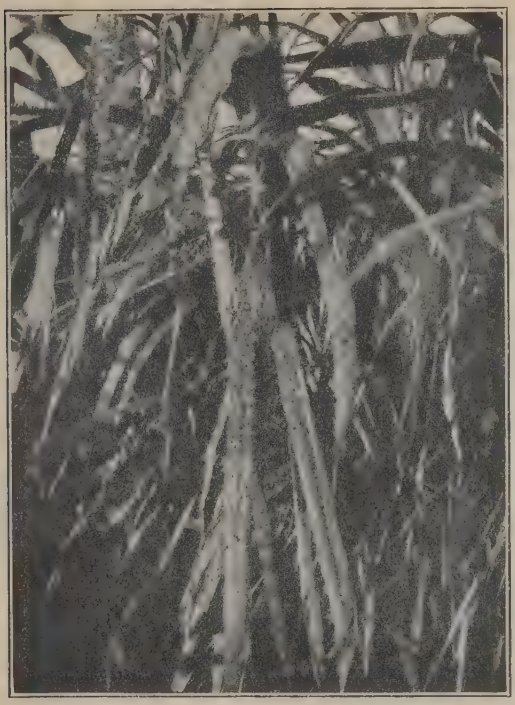

FIG. 56.—Cane leaves covered with flies bred out in above Engrais.

FIG. 57.—Carefully constructed closed Engrais at Mon Loisir (Adam) Estate. Rivière du Rempart.

[FIGS. 50–57 are reproduced from Dr. Andrew BALFOUR's "Report on Medical and Sanitary Matters in Mauritius, 1921."]

BENGAL. **Fifty-Fourth Annual Report of the Director of Public Health for Bengal, 1921.** [BENTLEY (Charles A.), Director of Public Health.]—pp. iii + 50 + xxxix + 7. 1923. Calcutta: The Bengal Secretariat Book Depot. [Price Rs. 2–12.]

"Deaths from maternal causes.—Observations on the ages of the mothers in 3,700 cases of child-birth have shown that 3·4 per cent. were under 15, 32·1 per cent. were ages 15–20, 48·5 per cent. 20–30 years and 1·1 per cent. 40–50 years. There are grounds for believing that pregnancy or child-birth directly or indirectly influences the deaths among females during the child-bearing period to the extent of 8 to 10 per cent. of those under 15, 50 to 60 per cent. of those between 15 and 20, 30 to 33 per cent. of those between 20 and 30, and 3 or 4 per cent. of those above 40 years of age. Assuming this to be the case, maternal causes must have been responsible for over 60,000 female deaths in Bengal during 1921. This conclusion is supported by the careful analyses of female deaths at different age periods for a number of years past, which appear to indicate that ordinarily from 60,000 to 75,000 deaths among women are occasioned by pre-natal, natal and post-natal conditions. Data obtained in a number of cases recently by the Department of Public Health suggest that accidents of labour occasion 5·4 maternal deaths per thousand births, puerperal fever 6·5 per thousand births, and tetanus after child-birth 0·8 per thousand births. In the light of these figures it is possible that about 16,500 female deaths in the current year were directly due to these causes, over 7,000 being caused by accidents of labour, nearly 8,500 by puerperal septicaemia, and about 1,000 by tetanus following child-birth. As to the causes of the remaining maternal deaths occurring during pregnancy or following child-birth, we have no certain knowledge, but it is well-known that a large number of women in these conditions fall victims to eclampsia, anaemia and the post-natal condition termed 'sutika.'"

The dysentery and diarrhoea death-rates of Bengal obviously are of very little value. Three places where the water supplies are really good head the list, namely, Howrah, Calcutta and Darjeeling. In the case of Howrah and Calcutta the reason must be correct reporting of deaths, to which must be added, as has been suggested by the Director of Public Health, the large number of beggars that exist in these big industrial centres. The disease is certainly not water-borne. The following remark shows that the registration in the districts understates the figures considerably.

"The Murshidabad observations on vital statistics gave an average death-rate from dysentery of 3·0 per mille and from diarrhoea of 2·1 per mille, the aggregate being 5·1 per mille, and these two diseases accounted for nearly 11 per cent. of the total mortality. Assuming that this is a fair index for the province and allowing for the proportion of deaths that escape record, there must each year be 100,000 to 140,000 deaths from dysentery and from 50,000 to 100,000 deaths from diarrhoea. It would appear that at present less than one-sixth of the deaths due to dysentery and diarrhoea are correctly diagnosed and reported."

BOMBAY CITY. **Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1921–22. Vol. 2. Annual Report of the Executive Health Officer for 1921.** [SANDILANDS (J. E.), Executive Health Officer.]—107 pp. With 4 diagrams. 1922. Bombay: Times Press.

It will be seen from the diagram (fig. 58) "that diseases of the respiratory system have caused, as usual, a higher death-rate (19) than any other group. The group coming next on the list for the year under report with a death-rate of four comprises the deaths attributed to malaria, ague, and remittent fever. Congenital debility and diseases of early infancy constituted the next most fatal group, giving a death-rate of nearly 4 per 1,000 persons living."

INFANT MORTALITY [IN BOMBAY CITY] BY THE NUMBER OF ROOMS OCCUPIED IN 1921.

| | Births. | | Deaths in Infants. | | Infant mortality per 1,000 births registered. | |
|---|---|---|---|---|---|---|
| | No. | Percentage | No. | Percentage | 1921. | 1920. |
| 1 Room and under .. | 14,074 | 73·58 | 11,661 | 91·45 | 828·5 | 631·1 |
| 2 Rooms .. .. | 1,022 | 5·34 | 329 | 2·57 | 321·9 | 304·0 |
| 3 Rooms .. .. | 282 | 1·47 | 54 | 0·42 | 191·4 | 295·1 |
| 4 or more Rooms .. | 240 | 1·25 | 32 | 0·25 | 133·3 | 289·5 |
| Road-side .. .. | 33 | 0·17 | 16 | 0·12 | 484·8 | 400·0 |
| Hospitals .. .. | 3,474 | 18·16 | 659 | 5·16 | 189·6 | 308·9 |
| Total .. .. | 19,125 | 100·00 | 12,751 | 100·00 | 666·7 | 552·2 |

"The percentage of population occupying a tenement of one room and under to the total number of occupants in each class of tenement in the City by the Census of 1921 was 65·88. Of the 19,125 births registered in the year, 14,074, or 73·58 per cent., occurred in families living alone in a single room or sharing it with others, and the number of deaths in infants in this class of population was 11,661, or 91·45 per cent. of the total infant mortality."

It will be observed from the statement and fig. 59 "that the rate of deaths among infants in single room tenements per 1,000 births in single room tenements during the year was 828·5, against 631·1 in 1920, and that the proportion of deaths to births varies inversely as the number of rooms occupied by the parents."

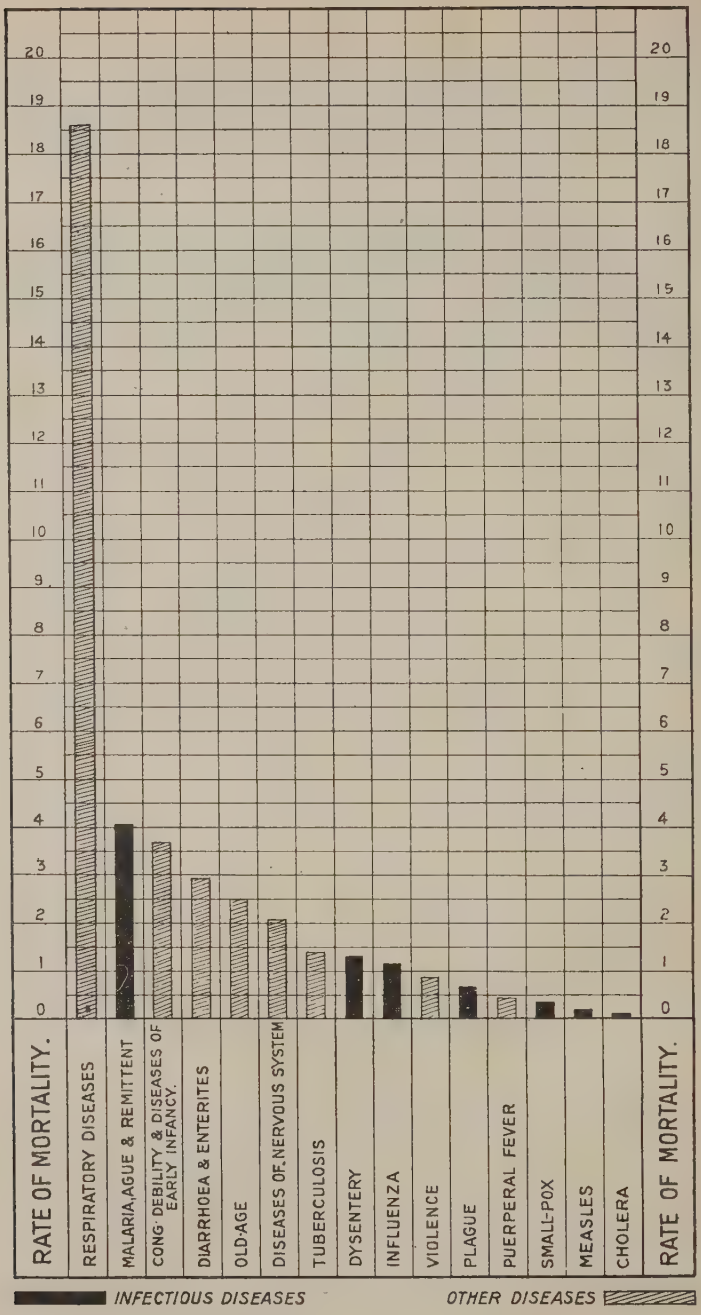


FIG. 58.—Death-rates per 1,000 of population from epidemic diseases and certain other principal causes in Bombay City in 1921.

[Reproduced from *Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1921–22*, Vol. 2. *Annual Report of the Executive Health Officer for 1921.*]

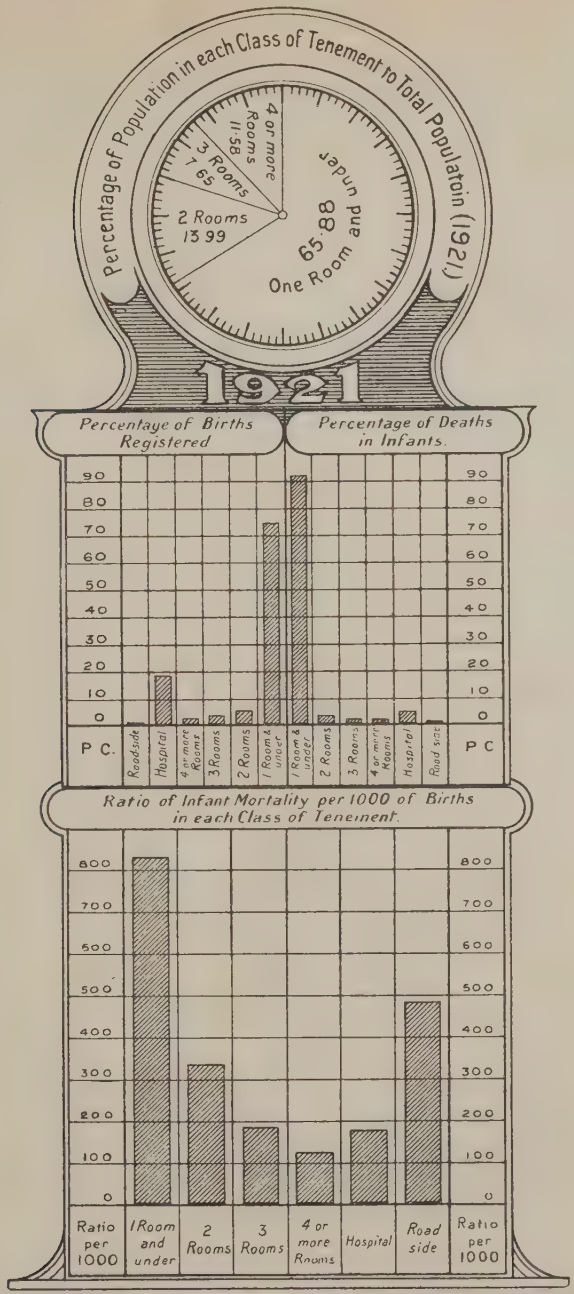


FIG. 59.—Diagram showing percentage of population, births and deaths in infants, and the ratio of infant mortality in each class of tenement in Bombay City in 1921.

[Reproduced from *Administration Report of the Municipal Commissioner for the City of Bombay for the Year 1921–22*, Vol. 2. *Annual Report of the Executive Health Officer for 1921.*]

CAPETOWN. **The Corporation of the City of Capetown. Annual Report of the Medical Officer of Health for the Year ended 30th June, 1922.** [ANDERSON (A. Jasper), Medical Officer of Health.]—lxxx pp. With 1 folding chart. Cape Times Ltd. [Price not stated.]

The letter below gives a brief summary of the annual report of Capetown.

"In presenting my report on the health of Capetown during the period July 1st, 1921, to June 30th, 1922, I wish to draw your attention particularly to the favourable vital statistics revealed in the report. The crude death-rate was 11·88 for Europeans, which is the lowest since unification, the next lowest being 12·84 in 1915–1916, being 1 per 1,000 of the population higher; for non-Europeans 27·46 is the crude death-rate, which is also the lowest, the next lowest being 27·66 in the year 1915–1916. If the deaths of persons who came into the city for treatment or other causes are deducted, the death-rate for Europeans is the very favourable one of 10·63, and for non-Europeans 26·18, which is low for that section of the community, being the lowest on record for Europeans, and for the non-Europeans practically identical with that of 1915–1916. The death-rate from the principal infectious diseases is low. Thus there were no deaths from smallpox, measles, and scarlet fever; those from whooping-cough and diarrhoea enormously decreased, and from enteric fever reduced about 20 per cent., but from diphtheria slightly increased. In the case of enteric fever and diphtheria there is considerable room for improvement, and indications up to date point to that occurring, which will be contributed to by the rapid connection of the drainage of the houses in the suburbs to the sewers.

"The infant mortality figures are very encouraging and show that the increased attention paid by the Department and other agencies to infant welfare is bearing fruit. The rate amongst Europeans was 69, amongst non-Europeans 176, and all classes 137, being the lowest on record for the city.

"The death-rate for the seven principal zymotic diseases was 0·33 for Europeans, 1·51 for non-Europeans, and 0·85 for all classes. These rates may be considered very satisfactory when compared with similar rates for the previous year, which were, 0·86, 3·52, and 2·06 respectively, and are the lowest on record.

"These results have been arrived at in spite of the overcrowding and scarcity of house accommodation in the city, and speak volumes for the activity of the Department in carrying out its multifarious duties. The Health and Building Regulations Committee is to be congratulated."

NATAL. **Report of Superintendent of Education for Natal, 1921.** [Extract from Report by Dr. Kaye SHARPE, Medical Inspector of Schools for Natal, 1921, forwarded by Dr. F. G. CAWSTON.]

Dr. Kaye SHARPE quotes Dr. CAWSTON as saying that one of the greatest causes of Bilharzia infection amongst school children in Natal is the habit of bathing in ponds infested with the molluscan host of the parasite.

Dr. CAWSTON gives an instance in which 43 school children were thus infected. He also states that keeping of ducks by the owners of ponds is a satisfactory way of getting rid of Bilharzia, because they eat the small host. The otter, which has been regarded as a means of controlling the disease, feeds on the crabs which devour the snails; consequently it does harm rather than good.

EGYPT (Ministry of the Interior). **Report of the Medical Officer of Health, Cairo City, for the Year 1920.** [WILLIAMS (P. G. S.), M.O.H., Cairo City.]—57 pp. With 11 charts & 9 figs. 1921. Cairo: Govt. Press. [Price P.T.25.]

Estimated population of Cairo (1920) 761,300, of which 72,770 are foreigners.

Annual birth-rate for 1920 47·3 per mille, an increase of about five on the previous year.

Death-rate 41·4 in 1920, 49·4 in 1918. This figure was considerably increased by influenza.

Infantile mortality 255 per thousand children born, the main cause being, as usual, diarrhoea, prevalent in the hot weather.

Communicable diseases.—The rate per thousand of the population was 6·155 and the death-rate 1·899. Typhoid fever morbidity rate 1·176, death-rate 0·273. Diphtheria, the lowest for nine years, 0·418 per thousand of the population. Relapsing fever, morbidity rate 0·545, death-rate 0·029. Influenza morbidity rate 2·019, death-rate 0·165.

PALESTINE. **Annual Report of the Department of Health, Government of Palestine, for the Year 1921.**—81 pp. Printed at the New Jerusalem Press. [Price not stated.]

"The general organization of the Department of Health is shown in a graphic form in an appendix and may be shortly described as follows:—

"A. The Directorate, composed of five sections: (1) Epidemic and Public Health; (2) Medical and Hospital; (3) Laboratory; (4) Quarantine, Relief and Lunacy; (5) Medical Stores.

"B. Principal medical officers at each district headquarters who control within their district health, medical and quarantine services through the medium of—

"C. District and sub-district medical officers of health, hospital and quarantine medical officers who again control—

"D. Sanitary sub-inspectors, antimalarial and quarantine sub-inspectors, disinfecting staff, nursing staff.

"Under section (1) the sanitary engineering sub-section deals with antimalarial projects and co-ordinates the sanitary projects of health with those of public works.

"A sub-section of (2) deals with ophthalmic hospitals, ophthalmic treatment of school children, and specialized surgery.

"Section 3 incorporates, in addition to bacteriological laboratories, chemical and analytical and entomological sub-sections under expert control.

"A sub-section of (4) controls railway sanitation, and medical treatment of railway employees between Kantara, Haifa and Maan.

"District offices of health in charge of a medical officer are situated in each of the following towns: Jerusalem, Haifa, Nablus, Nazareth, Jaffa, Ramallah, Acre, Jenin, Tiberias, Ramleh, Bethlehem, Shefr Amr, Tulkeram, Safed, Gaza, Hebron, Beisan, Mejdel, Beersheba.

. . . . . .

"The greatest problems of health in Palestine are found in those diseases which are due to the neglect of centuries, malaria and trachoma. The devastation caused by malaria reached its climax during the recent military campaign in Palestine when moving masses of Turkish troops, almost all suffering from malaria, carried the disease from place to

place and, through the agency of the anopheline mosquito, so plentifully breeding in innumerable rock cisterns, infected the whole population already weakened by semi-starvation. It is against this disease that much has already been done, with gratifying results, but until drainage of long neglected but rich agricultural areas is carried out, and until alternative water supplies are developed in towns and villages, malaria will continue to be prevalent in many districts.

"Of the treatment of trachoma we have as yet only touched the fringe."

FIJI. **Legislative Council, Medical Department. Annual Medical Report for the year ending 31st December, 1921.** [MONTAGUE (A.), Chief Medical Officer.]—37 pp. 1922. Suva: Govt. Printer. [Council Paper No 51.]

In the annual report of the Fiji Islands is an interesting article on some original work done by Dr. A. CARMENT, the Port Officer and Bacteriologist of Suva.

The ordinary house-fly which breeds in manure heaps is attacked in the pupal, not in the larval, stage by a small wasp-like insect. Apparently this insect seeks for pupae as soon as the manure becomes sufficiently dry, and having found one inserts several eggs. These hatch out larvae which devour the fly in the pupa. The writer considers that this is an important method of getting rid of flies in the Fiji Islands.

The writer also discovered an ingenious way of marking flies so that they could be recognized again when caught after liberation. Instead of spraying them with carbol-fuchsin, which gets washed off by rain, he fed them on sugar and water coloured with ½ per cent. of carbol-fuchsin. This stained the abdomen an easily recognized pink colour, for although much of the dye was voided, the viscera remained stained. The fly was apparently none the worse.

FEDERATED MALAY STATES. **Report of the Senior Health Officer, Federated Malay States, for the year 1921 (Supplement to Medical Report, 1921).** [WELLINGTON (A. R.), Senior Health Officer.]—12 pp. 1922. Fed. Malay States: Govt. Press.

*Vital Statistics of the Four Large Towns.*

| | Kuala Lumpur. | Ipoh. | Seremban. | Taiping |
|---|---|---|---|---|
| Estimated population .. | 81,197 | 37,194 | 17,479 | 21,178 |
| Birth-rate per mille .. .. | 20·35 | 23·85 | 28·03 | 31·97 |
| *Death-rate per mille .. | 27·02 | 20·38 | 36·16 | 50·05 |
| Malaria: death-rate per mille | 5·23 | 11·24 | 11·76 | 25·06 |
| Dysentery and diarrhoea: death-rate per mille .. | 3·62 | 2·39 | 16·71 | 6·06 |
| Pulmonary tuberculosis: death-rate per mille .. | 3·21 | 4·54 | 6·23 | 3·95 |
| Beriberi: death-rate per mille | 0·33 | 0·27 | 2·88 | 0·69 |
| Infantile mortality rate per 1,000 births .. .. | 240·92 | 174·75 | 312·24 | 210·60 |

* The corrected death-rates are calculated on the total number of deaths occurring within the Sanitary Board limits and include infants less than 30 days old, but exclude other persons who had been, at the date of death, resident for less than 30 days within the Sanitary Board limits.

FALKLAND ISLANDS. **Annual Medical Report on the Falkland Islands and its Dependencies for the year 1921.** [DEANE (F. G. W.), F.R.C.S. Ed., Colonial Surgeon.] [M.S. received from Colonial Office.]

"Prevalence of sickness.—The place continues to maintain a very high position from a health point of view, there having been no epidemic of any infectious or contagious disease during the year ending 1921. The high winds that prevail are undoubtedly the purifying agent at work, which coupled with rapid atmospheric changes, does not appear to be favourable to bacterial development, as virulent sepsis is practically never met with."

Vital Statistics.—Total population as per census in 1921, 2,380; births, 55—males 29, females 26; deaths—21, males 12, females 9; death-rate per 1,000 6·14; birth-rate per 1,000 16·09.

The annual report of this colony can be printed on two sides of a sheet, and as one out of ten of the medical cases mentioned in the report is "insomnia" some idea of the healthiness of the people can be formed. Happy colony!

TRINIDAD AND TOBAGO. **Council Paper No. 84 of 1922. Health Conditions, 1921. Administration Report of the Medical Inspector of Health for the Year 1921.** [DICKSON (J. R.), Medical Inspector of Health.]—14 pp. 1922. Port-of-Spain: Govt. Printing Office, [Price 6*d.*]

*Summary of Vital Statistics.*—Population estimated to mid-year, 366,760. Area of Trinidad (1,754 sq. miles). Tobago (114 sq. miles), 1,868 sq. miles. Density of population, 196 per sq. mile. Total number of births registered, 11,627. Birth-rate per 1,000 of population, 31·7. Total number of deaths registered, 8,824. Death-rate per 1,000 of population, 24·05. Natural increase, *i.e.*, excess of births over deaths, 2,803. Total number of still births registered, 923. Number of deaths of children under 1 year, 1,625. Infantile mortality rate (per 1,000 deaths), 139; Notifiable infectious diseases total death-rate per 1,000 of population, 3·23. Death-rate per 1,000 population, malaria 2·42; enteric fever ·65; dysentery ·6; diarrhoea and enteritis 1·6; pulmonary tuberculosis 1·28; bronchitis and broncho-pneumonia 1·74; pneumonia 1·0; nephritis and Bright's disease 1·42; cardiac diseases 1·06; ankylostomiasis ·75.

BRITISH HONDURAS. **Medical Report for the Year 1921.** [GANN (T. W. F.), Principal Medical Officer.]—pp. 10 + 4 + 2 + 4 + 2 + 1. 1923. Printed at H.M. Prison, Belize. [Price not stated.]

In September and October, 1921, two cases occurred which were almost certainly yellow fever, probably of local origin. A special medical commission was formed, houses were visited and upwards of 2,300 receptacles were found to contain stegomyia larvae. The insects were found in 49 per cent. of the houses and 28·5 per cent. of the water containers.

Oiling, screening and the usual measures were vigorously undertaken, the screening of the barrels and containers free of cost.

NOGUE & ADAM. **La Mortinatalité et la mortalité infantile dans les Colonies françaises.**—*Congrès de la Santé Publique et de la Prévoyance Sociale.* Sept. 11–17. 1922. 32 pp. Marseille : Commissariat Général de l'Exposition Coloniale, Rue Noailles, 5.

This official pamphlet deals with infant mortality and allied subjects in all the French Colonies. It is an extremely interesting publication but is rather too detailed for review here.

It discusses such points as the fecundity of the races in the various Colonies, the causes of sterility, the cause and treatment of abortion, the native method of accouchement, the percentage of still-births and infant mortality, its causes and remedial measures.

The causes of abortion and still-birth are much the same all over the tropics, namely ignorance of the parents, syphilis, malaria and other diseases, and in some cases immaturity of the parents.

As regards remedial measures in the French Colonies great attention has been paid to the education of native mid wives, which has given most encouraging results. In certain colonies there is a growing tendency amongst the natives either to go into hospital or to send for qualified assistance at the time of child birth : thus, the increase in the figures for Tonkin from 536 in 1911 to 4,614 in 1920. In addition some ten thousand cases were attended by trained midwives in their homes.

All interested in infant welfare work in tropical countries should obtain this report.

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## MISCELLANEOUS.

HAMID (A.). **A Scheme of Medical Inspection of Scholars in Secondary Schools.**—*Indian Med. Gaz.* 1923. Feb. Vol. 58. No. 2. pp. 62–66.

The writer gives an account of what may be legitimately called a "Paper" Organization of Inspection of Schools suited to Indian conditions, but unfortunately little of his own opinion as to the utility and results obtained.

A set of forms which he considers necessary, to be filled up by the Inspector and by the Schoolmaster, is extremely elaborate, and although doubtless necessary in a careful survey we rather doubt whether the ordinary schoolmaster is able or willing to undertake this additional labour.

The writer recommends grouping boys in age groups, but the disadvantage is that the boys will generally be found to be scattered throughout different classes and this therefore increases the amount of work.

He discusses the advantages and disadvantages of a card index system of records as against the proposition to bind up the various forms into a single volume for each school. It is not very clear which he actually recommends.

While we do not wish to criticize adversely the work of School Inspectors in India, we should like to point out that we consider the system is "top heavy." From an extensive experience of primary,

secondary and high schools in India we rather doubt the utility of collecting all these statistics until the teachers are properly paid, the school rooms in large towns properly ventilated and lighted, and suitable latrine accommodation in country schools provided.

HEALTH: Published under Authority of the Minister for Health. Melbourne: 51, Spring Street. 1923. Jan. Vol. 1. No. 1. pp. 1–24.

The Commonwealth of Australia has recently started a monthly journal called "Health" dealing with developments in the field of public health in Australia.

The first number contains several very interesting articles and gives a review of past work in Australia, by Prof. Sir Harry ALLEN, M.D. Besides this there are articles on the "Rôle of the Bacteriological Laboratory in Public Health Work," which is well illustrated; "Hookworm Disease in Relation to the Medical Profession and the Individual"; "Industrial Hygiene and the Physician" and the Sanitary Engineer and the Health Officer.

We recommend this publication to all sanitarians in the East, particularly to those interested in port and general sanitary work.

JOYANT (E.). [**L'urbanisme au Maroc.**]—*La Technique sanitaire et municipale.* 1922. Apr. Vol. 17. No. 4. p. 88. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1923. Jan. Vol. 15. No. 1. pp. 146–147.]

The paper describes the measures for town-planning taken throughout the various towns of French Morocco. It was recently decided that all new towns should be laid out to a proper plan; consequently enactments were prepared for (1) the establishment of proper plans; (2) the appropriating of certain ground for public use; (3) certain building regulations as regards alignment of streets, heights of houses, etc. Furthermore the suburbs were reserved for a certain class of houses and all dangerous trades were excluded from these areas. Laws regulating the appropriation of land and terms of compensation were also promulgated. The condition and the amount of work done in various towns in the Colony are also described.

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## REVIEWS AND NOTICES.

PEARSON (A.) & MOUCHET (R.). **The Practical Hygiene of Native Compounds in Tropical Africa. Being Notes from the Experience of the First Eighteen Years of European Work in the Katanga.**——pp. xiv + 188. With 44 plates. 1923. London Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden. [Price 22s. 6d. net.]

From the title-page of this book one learns that the contents form a summary of the experiences gained during 18 years medical and sanitary work among native labourers employed on the Katanga Mines in the Congo. It is divided into two sections and contains a preface by Dr. Andrew BALFOUR, itself a guarantee of the pages that follow.

The first part deals with Compound Hygiene, the second with Epidemic Diseases and Pathology. The former contains chapters on—the arrangement of compounds; the construction of houses; latrines and sewage disposal; water supplies; diet and feeding; attendance upon the sick; and the recruiting of native labour.

Every medical man who has ever attempted the solution of some of these problems will remember how difficult he found it to glean any information of value from the ordinary text book, how only after many years of experience, with trial and failure, close study of local conditions and untiring attention to detail, etc., did he find himself a really competent official.

Doctors Pearson and Mouchet as the result of many years such experience have produced one of the few books of real practical value to medical men engaged in similar problems.

Though the book deals entirely with questions of hygiene affecting compounds provided to accommodate natives employed in the Katanga mines, these questions are so similar to those presented in connection with native labour elsewhere in tropical Africa, with native locations, barracks, prisons, etc., that there can be no hesitation in saying it must find a place on the bookshelves, or rather in the hands of every sanitary officer in tropical Africa, and many other parts of the world.

Here are no empirical formulæ, no useless general statements, but practical solutions of difficulties met with, the why and the wherefore, and full necessary detail. The importance of a sympathetic understanding of native habit and custom and native psychology is well shown, as instanced, for example, in the chapter on diet and feeding. All those other than medical men interested in native administration would learn much from the principles which may be read in this volume.

Some of the most interesting observations relate to the high sick rates, especially from pneumonia, which obtained among natives removed for the first time from their normal village life to compounds and good sanitary conditions, but where instead of living in the semi-isolation of the native village huts, they came into close contact with each other and with other groups of natives from other parts of the country, and how such natives develop an "immunity to compound life," how in fact they become "salted" but only after a considerable number of months.

These observations, and much else, in every chapter of the book, form a valuable contribution to tropical African epidemiology, and go to show how big are the problems awaiting further study. The results of extended vaccination against pneumonia after the method of Lister on the Rand Mines were not available at the time of publication. The authors mention that they had found it necessary to adopt prophylactic inoculation against typhoid fever, a disease which has often been considered rare in many African countries; they do not, however, distinguish between enteric and the paratyphoid fevers. Their remarks on the subject of tuberculosis are of importance—it is a disease that must be reckoned with in the future in Africa.

Helminth infections do not figure largely as a cause of invalidity; this was the experience of the reviewer in another part of Central Africa, where though perhaps 80 per cent. of the population harboured ankylostomes, the infestation was a light one. One is surprised, however, to find that amoebic dysentery has a comparatively slight incidence in Katanga as it is common enough in some adjoining countries. Malaria also is stated to play little part in causing illness, and indeed the authors appear to think that their adult natives were not infected, or else they do not clearly distinguish between immunity and tolerance on the part of the native in regard to malaria. All medical men will not agree that "a single dose of 606 is sufficient for a case" in yaws. The statement in regard to the classification of vitamins on p. 75 is perhaps not quite free from objection, and again the list of different natives given on

p. 124 does not make for clearness. Mention must also be made that there is no index. These minor criticisms excepted, one feels nothing but admiration for this book and the work which formed its basis.

Hugh S. Stannus.

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It is with great regret that all readers will learn that just as this book issued from the press news was received from Rhodesia of Dr. Pearson's death in trying to save the life of a native.

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Macpherson (W. G.), Horrocks (W. H.), & Beveridge (W. W. O.). [Edited by.] **History of the Great War Based on Official Documents. Medical Services. Hygiene of the War.** Vol. I. pp. xii + 400. Vol. 2. 506 pp. With numerous figs. & charts. 1923. London. H.M. Stationery Office. [Price £1 1s. net each.]

*Vol. I. Chapter III and Appendix B.—Purification of Water.* [pp. 68–97. With 6 figs.; 358–378. With 1 fig.] [By Arthur (J. S.)]

The first portion of the chapter deals with experimental work prior to the war. Following on experiences during the South African War, much consideration was given to the subject, as the provision of a safe drinking water for troops in the field always has been, and always will be, a matter of the first importance. Descriptions are given of the various methods adopted from time to time in the endeavour to provide a potable water, and reasons are detailed for the rejection of succeeding types of apparatus. Modifications became necessary for various reasons; sometimes because the earlier designs were found on trial to be inefficient, at other times because they were unsuitable to the transport conditions of a field army. Experimental work gradually pointed the way, and by the time hostilities commenced in 1914, it had been accepted that reliance should be placed on chlorination after clarification. That this confidence was in no way misplaced is abundantly shown in the remarkable freedom from water-borne disease of great armies operating in temperate and tropical climates; while various other factors were co-operative in this satisfactory state, there can be no question that a safe drinking water supply played no inconsiderable part.

The History goes on to explain how improvements on the crude methods of chlorination in force during the early days of the war were from time to time introduced as the result of experience. Amongst these was the water sterilization Test Case, a simple apparatus whereby the dosage of hypochlorite of lime, needed for the treatment of a given water, can be readily calculated. Appendix B gives details of the Test Case and also much useful information on other matters of water supply, such as the "Efficient Working of Filtration Units," "Working Instructions for a Chlorine Gas Type of Water Sterilization Plant (Wallace-Tiernan Chlorinator)," dechlorination, etc., which would be of value to those concerned in the provision of potable water to mining camps, villages, or towns, either in the tropics or in temperate climates.

The major portion of Chapter III is concerned with the removal of poisons from water and gives some small idea of the vast amount of work undertaken in view of the possibility of such methods being adopted by the enemy. Appendix B also contains directions to chemists employed on water purification duties, and deals with methods of detecting and removing poisons.

Although not of general interest to those engaged on water supply questions at the present date, yet it is useful to know where information on these matters could be obtained if necessity arose.

*Vol. I. Chapter XII. Disposal of Waste Products.* [pp. 185–245. With 57 figs.] [By Daukes (S. H.)].

This chapter is a store-house of information. As in many parts of the tropics, except possibly in the large towns, sanitary arrangements are more or less of a simple nature and approach very nearly the conditions met with on active service, the Medical Officer of Health or Sanitary Inspector whose work lies in such places will find the matters dealt with instructive and helpful. Many useful illustrations accompany the text, and increase in no mean way the value of the information available. As might be expected, improvisation of apparatus is much to the fore, and one learns for what divers purposes a kerosene tin or other "waste product" may be advantageously utilized.

The first portion of the chapter deals with latrines and the disposal of latrine materials by incineration and pitting. The following section is concerned with the disposal of urine. Next in order follow the disposal of dry refuse and the disposal of liquid refuse.

In Appendix D are directions for the use of lime in clarifying waste water, details being given of special methods for dealing with greasy or soapy water wastes in areas which are limited or on which soil absorption is bad.

The chapter is eminently practical and gives the results of much trial and error in the adaptation of simple material to sanitary needs. Its perusal cannot fail to be helpful and productive of inspiration to anyone concerned with sanitary efficiency, especially in the tropics.

*Vol. I. Chapter XVI. The Hygiene of Transports.* [pp. 327–347. With 3 figs.] [By Horrocks (W. H.)].

This chapter will be mainly of interest to medical officers who have to deal with ships, especially those concerned with immigration. The outcome of much practical experience is condensed in the chapter.

Amongst the various matters considered may be mentioned—

(*a*) The arrangement of hammocks so as to afford as much air space and distance from mouth to mouth of occupants as possible, without unduly lessening the number of men accommodated in a given area.
(*b*) The position, design, materials of construction, scale of provision, and general maintenance of latrines and urinals.
(*c*) Similar information as regards ablution arrangements.
(*d*) Particulars as to storage and distribution of drinking water.
(*e*) Messing accommodation.
(*f*) Hospital provision.
(*g*) Disinfection.

The Inspection of hired ships is dealt with, and much valuable information is available, in the sections devoted to the measures taken during the pandemic of influenza. These measures included medical inspection of troops prior to embarkation, use of anti-catarrh vaccine (preferably before going on board ship), structural arrangements to increase floor and cubic space and ventilation, and provision of spray rooms on transports.

The concluding section deals with the precautions taken to prevent the introduction of infectious diseases into the United Kingdom, both during the period of the war and on demobilization.

One must not lose sight of the fact that the measures adopted were applied to bodies of men under military discipline, and that it is not usual to find legal enactments providing for similar dispositions in peace conditions and amongst a civilian population. Even so, there is much in the chapter which is sound preventive medicine and that, with suitable modification, might possibly be made applicable to conditions of ordinary life.

*Vol. II. Chapter VIII. Prevention of Malaria.* [pp. 189-238. With 13 figs.] [By MacDonald (A. G.)]

The chapter commences with "Conditions in War Areas," in which the geographical distribution of the disease is considered and the local factors in malaria production in the various countries are indicated.

The next section deals with "Seasonal and Meteorological Factors," in which much of interest is to be found relative to rainfall, temperature, and season. A geographical limit is recognized beyond which, in both the northern and southern hemispheres, indigenous malaria does not occur under natural conditions. This boundary is represented by an isotherm of 59° to 60° F. and moreover the mean temperature of about 60° F. must be continued for about sixteen days to allow of the establishment of malaria infection. The war areas are dealt with individually, and concise details as to temperature, rainfall, annual commencement of malarial infection, etc., are given.

Next follows a section on "Entomological Factors," in which the bionomic peculiarities of various anopheline mosquitoes are discussed, and lists of the species recorded in the different countries are furnished. In the section dealing with "Parasitological Factors" data are given of the three forms of malarial parasite. Amongst the matters mentioned are—the proportion of infections by the different parasites, the order in which infections appear during the malarial season, the virulence and amenability to treatment. "Morbid Significance" is next dealt with, and one can readily realize from the details given how great a factor malaria is in contributing to inefficiency, especially where the disease is severe, as in Macedonia.

The rest of the chapter is devoted to "Preventive Measures," which are dealt with under four main headings—(1) Drug Prophylaxis and Treatment; (2) Culicifuges; (3) Personal Protection, and (4) Mosquito Destruction. Although no new principles can be said to have been evolved as a result of war experience, on the other hand improvements or adaptations of existing methods were effected. There are many excellent illustrations of anti-mosquito methods which add to the value of this section. The whole chapter constitutes a short account of a vast expenditure of time, money, energy, and skill in attempting to combat a disease with which many medical officers abroad are often concerned. As such it will well repay careful study, and may possibly suggest methods of control which might suitably be brought into use as an addition to those already in force in any particular locality.

*Vol. II. Chapter XI. Prevention of Flies.* [pp. 301–326. With 2 charts & 3 figs.] [By Sewell (E. P.)]

This is essentially a practical chapter containing much information on fly prevention methods, and giving a useful bibliography at its conclusion.

The first portion of the chapter deals with the evidence incriminating flies as disease causers to man.

The close correspondence between the prevalence of these pests and the incidence of dysentery is illustrated by charts. The bionomics of house flies are discussed from the point of view of control and destruction, and details are given as to their travelling capabilities.

The following sections deal with preventive methods directed against the eggs, larvae, and pupae. Short and clear descriptions are given of various methods of dealing with horse manure; the prevention of fly-breeding in "deep pit" latrines is detailed; various chemical substances useful in fly control are mentioned and their values assessed; on the possible rôle of the incinerator as a fly nursery a warning is issued; methods of dealing with refuse and carcases of animals are advised. Against the adult fly many measures may be directed: traps (many and various in design and ingenuity); "Tanglefoot"; poisons; sprays; flame; fumes; and flaps. Protection of food-stuffs by means of fly-proof meat safes, or

under certain circumstances fly-proof kitchens are mentioned, and the use of fishing net hung loosely over the windows and doors of dwellings has its value in keeping down the number of flies inside houses. The chapter is brought to conclusion by a short note on sandflies, details being given of breeding places, habits, and measures of protection against their bites by fumigation, spraying, deterrents, and nets.

Anyone at home or abroad who wishes to learn reliable methods against flies will find in this chapter a sure guide to the subject.

G. E. F. Stammers.

*Vol. II. Chapter XII. Prevention of Infestation by Lice.* [pp. 327–388. With 18 figs.] [By Horrocks (W. H.)]

This article chiefly deals not as its title would imply with the protection of clean people from the attacks of lice, but with the disinfestation of armies already very heavily infested. The measures and methods adopted during the war for destroying lice in clothing and blankets and for cleansing lousy men occupy 48 of its 62 pages, and much of the few remaining pages is filled with descriptions and figures of baths and bathing. The question of forestalling the attacks of lice by eliminating lousy individuals before men proceed on service, and by the free and general use of insecticides by clean men is hardly at all considered, although the observations are recorded that one dusting of the underclothing with a powder consisting chiefly of naphthaline would keep off lice for several days, and that smearing of the underclothing and the seams of outer garments with a paste made of naphthaline and soft soap was quickly fatal to lice. The author indeed seems to have a positive objection to insecticides, apparently for the unintelligibly expressed reason that " the use of insecticides as a whole, either upon the person or clothing, is always a confession that men cannot be kept free from lice by direct means, in consequence of the lack of preventive measures, which is commonly due to infested men or infested clothing escaping attention in various ways and transmitting vermin." When, searching for some historical facts, one comes upon the stupendous statements that among British troops in the field it was not uncommon to find 95 per cent. verminous, and that 50 per cent. of the admissions into field hospitals were attributed to vermin and the personal uncleanliness that breeds them, one is considerably surprised at the final " General Conclusions " drawn up for general guidance in future campaigns. These conclusions seem to accept wholesale confirmed lousiness in the field as one of the unalterable postulates of war. Undoubtedly suitable provision must be made for keeping men clean and for possible outbreaks of lousiness ; but one of the lessons to be drawn from 95 per cent. of incidence and 50 per cent. of hospital admissions attributable to lousiness surely is that prodigious attempts should be made to forestall it at the very outset.

*Vol. II. Chapter XIII. Prevention and Control of Scabies.* [pp. 389–401. With 1 fig.] [By Horrocks (W. H.)]

Scabies in the army was very commonly associated with impetigo. This article does not contain anything new, except some records of experimental observations of the life-history of the itch-mite. The entire development from egg to adult was accurately determined to be from 9 to 15 days, the individual term being influenced by temperature and humidity. The adult female lives certainly 3 weeks. The female mite if removed from its burrow can make another burrow and lay eggs in a new host. In two instances abandoned articles of infected clothing were observed to be infective 6 and 11 days afterwards.

A. Alcock.

*Vol. II. Chapter XIV. Prevention of Bilharziasis* (*Schistosomiasis*). [pp. 402–420. With 4 figs.] [By MITCHELL (T. J.)]

It has been said that out of evil good may come, and it seems that the account given in this chapter might be taken as an example of this saying. The war, in certain of its areas, brought the disease prominently into notice, and much valuable research was carried out with the result that our knowledge of preventive and curative methods was greatly advanced, and placed on a sure foundation.

The work of the Leiper Mission to Egypt in 1915 elucidated the full life-history of the parasite (*S. haematobium* and *S. mansoni*) and indicated methods of prevention. Subsequently curative treatment with antimony tartrate, which may be said to be almost of specific nature, resulted from the method suggested by McDONAGH in 1912, and amplified by CHRISTOPHERSON and others.

Medical officers situated where this disease is endemic could scarcely fail to profit from a study of this chapter. The bibliography given at the end is a useful addition to the subject matter in the text.

*Vol. II. Chapter XV. Prevention of Trachoma.* [pp. 402–437. With 8 figs.] [By LISTER (W. T.)]

This chapter is the interesting account of conscientious work in preventive medicine and in treatment of Chinese and Egyptians with the B.E.F. in France afflicted with the disease in question. The excellent administrative organization of the campaign was rewarded by success as the result of the methods adopted, and the care with which they were carried out.

Any medical officer who has to deal with large bodies of natives in mine or plantation amongst whom this disease is a source of inefficiency will find much to interest and assist him in his work, and by such this chapter should be unquestionably consulted.

*Vol. II. Chapter XVII. Prevention of Plague.* [pp. 459–572. With 1 chart & 1 fig.] [By MITCHELL (T. J.)]

There is not much that need detain the reader in this chapter; little that is new in methods of prevention or of treatment was evolved as a result of the war. The account deals with the various theatres of the war which were or might be threatened with plague amongst troops and followers. While the possibility of invasion by the disease caused much administrative anxiety, and plans of campaign were in readiness to meet outbreaks of magnitude, especially in such countries as Mesopotamia, the methods adopted followed the already well recognized lines. As such they are of interest and are generally applicable to ordinary post-war conditions.

G. E. F. Stammers.

i. ARAUJO (H. C. de Souza) *et al.* **A Prophylaxia Rural no Estado do Pará.**—411 pp. With numerous illustrations. 1922. Brazil: Departmento Nacional de Saúde Publica. Serviço de Saneamento e Prophylaxia Rural no Estado do Pará. (Publicação destinada á commemoração do Centenario da Independencia.) Vol. 1. Pará–Bélem: Typ. da Livraria Gillet.

ii. ——. **A Prophylaxia da Lepra e das Doenças Venereas no Estado do Pará.** [Prophylaxis of Leprosy and Venereal Diseases in Pará State.]—311 pp. With numerous illustrations. 1922. *Idem.* (Publicação destinada á commemoração do Centenario da Independencia e á Conferencia Americana da Lepra.) Vol. 2. Pará–Bélem: Livraria Classica.

i. This volume, in commemoration of the Centenary of Independence, is issued under the auspices of the National Department of Public Health, and deals with rural sanitation in the State of Pará and the first year's activities of the local branch. An enormous amount of work has been

undertaken. Thus, at Belém, where the headquarters are situated, there is an Institute of Hygiene and a Service of Sanitary Police, an Institute for the prevention of Venereal Diseases, another for the treatment of Leprosy, and a colony at Tocunduba where lepers are segregated; moreover, several Sanitary Posts have been set up in different parts of the State.

The report is divided into two parts. The first deals with more general hygienic questions, and the sanitary history of the State up to the year 1920 when the department came into play. It describes briefly the various hospitals and asylums, giving tables of statistics of mortality, both total and infantile. Remarks follow upon the conservancy and water supply and the multifarious precautions taken to safeguard the purity of the latter.

The Institute of Hygiene at Belém, formed by the union of several laboratories, now consists of seven sections: (1) Coprological; (2) Haematological; (3) Venereal, for diagnostic purposes, including also diagnosis of material from suspected lepers; (4) Immunological, for Wassermann and agglutination tests, etc.; (5) Chemical; (6) "Hypodermic" section, where vaccines and other therapeutic injections are prepared; (7) Anti-rabic section. The dried cord method appears to be that in use here. 171 persons were treated during 1921, and none developed rabies. A list of fees charged for examinations at the Institute is given; these do not appear to be proportional to the amount of work required. Thus, for the Widal reaction, a Wassermann test, or preparation of an autogenous vaccine, there is the same charge of 50 dollars; a bacterial analysis of water costs 200, while Abderhalden's test for pregnancy or malignant tumours is only 150.

The second part is entitled Medical Geography. In its first seven chapters the different sanitary stations are described, and the work performed at each. Chapter VIII gives an account of various expeditions sent out to investigate the sanitary conditions of different districts. Next follows a report on Helminthiasis and Malaria. The former is very prevalent; of 45,713 persons examined 45,122 (or 98·7 per cent.) were found to be harbouring worms of some sort or other, and 79·21 per cent. of them had hookworm. For malaria 8,200 blood examinations were made and *P. vivax* was found in 1,772 (21·6 per cent.), *P. falciparum* in 1,797, or 21·9 per cent., the two together in 51 instances, *P. malariae* in 7 only. The final chapter deals with administrative questions.

ii. The first part of this work issued by the National Department of Public Health is written by Dr. De Souza Araujo, the latter by several collaborators. The first section forms an interesting record of Leprosy in Pará. It deals with the period 1746 to 1921, showing that the subject has exercised the minds of the authorities for many years. In 1838, out of a population of 120,000 in Belém there were 1,200 lepers. At Tocunduba an asylum had been established in 1816 at which 5 lepers were isolated, in 1879 there were 77, in 1921, 268, and in 1922, 305. Details of each case and of 918 cases undergoing treatment are tabulated. Including those in the interior of the State there were 1,354 lepers, of which 834 were males and 520 females. The most common age for contraction of the disease is given as between 6 and 10 years, and the highest mortality is in the fourth decade. An interesting table of the results of the Wassermann reaction in cases of leprosy is given. Of 134 patients with the nodular form 71 (57·07 per cent.) gave a positive reaction; of 309 anaesthetic cases 79 (25 per cent.), and of 116 "mixed" 53 (43·8 per cent.).

There is nothing to note in the section on treatment and prophylaxis, which are on the usual lines.

The second part is on Venereal Prophylaxis and the regulation of prostitution. In June 1921 an "Institute for the Prevention of Venereal Diseases" was inaugurated, with Dispensaries for free consultation and treatment, one for men, one for women and children, a hospital, and a laboratory for diagnosis. There is also a "Service for Domiciliary Aid" conducted by a woman who visits poorer persons, and especially any prostitutes who have been in the Institute. Full records are kept on

Syphilis and Gonorrhoea ; case-sheets and directions are printed for the guidance of patients to obviate the dissemination of disease. During the year—July, 1921–June, 1922—a total of 8,710 patients were dealt with at the Institute.

In support of the official regulation of prostitution HOLZENDORFF is quoted to the effect that as the Church, while condemning war, sends its ministers to console and help the sufferers, so it is unjust to reproach the State with countenancing debauch because it tries to put a check on unavoidable profligacy. There follows a detailed account of the measures applied at Belém and the anti-venereal work done at the different hospitals there, and, finally, a statistical chapter dealing with the various forms of venereal disease.

H. Harold Scott.

BARROS BARRETO (João de). **Serviços de Saneamento e Prophylaxia no Paraná, em 1922.**—137 pp. With 3 maps & 61 plates. 1923. Curityba : Empreza Graphica Paranaense de Placido e Silva & Cia. Lmtd.

The report for 1922 of the Public Health Department of Paraná also includes information from various rural Sanitary Depôts. The following, besides general hygienic measures, were the chief problems taken up :—

1. *Anthelmintic Campaigns.*—The results afford indisputable proof of the benefits accruing from the use of properly constructed latrines and the installation of private septic tanks. In places where the incidence was found to be very high (80–90 per cent.) all persons received treatment with 3 cc. of oil of chenopodium taken in three doses at hourly intervals. The patients were taken from their work in batches and kept under observation for 48 hours. In a few cases carbon tetrachloride was employed instead.

2. *Anti-typhoid and Anti-dysentery Measures.*—The installation of proper sanitary latrines greatly assisted these as well as the hookworm campaign. Improved conservancy and sewage disposal led to a reduction in the deaths from enteric fever from 1·6 to 0·2 per mille.

3. *Vaccine lymph* lowered the small-pox incidence, but no figures are given as to the prevalence of small-pox either in this or in previous years.

4. *Anti-malarial Campaign.*—Patients were treated energetically with quinine and " measures to protect against anopheles " were undertaken. No statistics are given.

5. *Leprosy.*—In the author's opinion the figures of ARAUJO, who gave 380 as the number of lepers definitely ascertained and 600–800 as the estimated total for Paraná, are exaggerated. They found 144 definite and another 141 possible, giving a total of 285. How the second of these figures is arrived at is not clear. Of the 144 cases 88 were of the mixed form (61 per cent.), the anaesthetic 31 (21·5 per cent.), and the nodular 25 (17 per cent.). Two-thirds of the cases were males. More than half (75 of the 144) were under 30 years of age. In 1922 a special Director and Inspector were appointed for this service, leprosaria were instituted, and also places set apart for observation of suspected persons.

6. *Venereal Diseases Campaign.*—Dispensaries were inaugurated for consultations and treatment, and rules were made for the regulation of prostitution and the examination of prostitutes. This part also loses much of its value from the omission of statistics.

To sum up : The book, which is well illustrated, gives evidence of much work actively planned and zealously performed, but its value would be greatly enhanced were definite figures given in support of statements. As it is, deductions only of a most general character can be made, and it is impossible to compare the results of the measures taken in Paraná with those of other States and Countries, and this after all is one of the chief uses of a Sanitary Record.

H. Harold Scott.

PLATT (Kate) [M.D., B.S. (Lond.), Formerly Principal, Lady Hardinge Medical College and Hospital for Women, Delhi, India]. **The Home and Health in India and the Tropical Colonies.**—x + 216 pp. 1923. London: Baillière, Tindall & Cox. [Price 5*s.* net.]

This is a manual written by a woman for women and the personal pronouns throughout the volume are mainly feminine. It has been written for the young wife, the mother, the sister, or grown up daughter sharing the life and managing the home of the Civil servant, soldier, or trader, in India or other tropical country. To such ladies the starting and maintaining of a home in those, to them, strange lands, is a great adventure and often surrounded with difficulties, most of which Dr. Kate Platt helps to remove. Comfort in the home in a tropical climate makes all the difference even to the most healthy; but the double title of the book recognizes that the question of preserving good health is not so simple a problem in the tropics as in a temperate zone. Of course there are compensations, new things to see and an open-air life free from many quite valueless conventions, and free, also, from certain blatant and nerve-wrecking forms of so-called progress. The authoress writes as one having experience and authority. She has served an apprenticeship in India and held the post of Principal of the Lady Hardinge Medical College in Delhi. The scheme of the book can best be expressed in Dr. Platt's own words. It is, like a well-known country, divided into three parts: "the first part of the book treats of social and domestic conditions; the second deals with the child in health and sickness; and the third part gives information about tropical diseases and what to do while awaiting the doctor whose arrival in a distant station may sometimes be delayed for hours or even days."

On page 54 we find advice as to the extreme importance of, at least, a fair colloquial knowledge of the language of the selected region. More than half the domestic troubles in tropic lands are due to ignorance of the spoken language, and consequent misunderstandings. The simple vocabulary of daily life is not difficult to acquire and once acquired it enables the lady of the house to say, with perhaps some levity in adaptation: "The difference to me."

The authoress describes preparations and outfit, the voyage, the climate, bungalows, the household and the "Day's Routine" in Part I, and although necessarily brief, gives sound information and advice. In Part II the food and clothing of the child and infantile maladies receive attention. "The objections to bringing up and educating children in India are largely based on reasons of climate, but of equal importance are the domestic and social conditions of life."

Part III enumerates the various diseases common in the tropics and for each ailment cause, symptoms and simple treatment are described.

It would be very easy to point out many things which the book might, and does not, contain. That, however, is not the reviewer's object. Taking Dr. Platt's book as it is, it is an excellent first-reader in domestic science and hygiene. There is a good index and the book is cheap. Such spellings of names as Cherabunji and Murray for Cherapunji and Murree are noticed, but the book is singularly free from printers' errors and the type is clear.

J. H. Tull Walsh.